

INFO WORLD

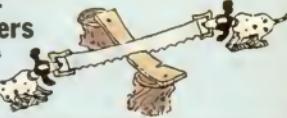
FEBRUARY 20, 1989

THE WEEKLY FOR PERSONAL COMPUTING PROFESSIONALS

FROM THE TEST CENTER

Project Managers

Seven products to handle even the biggest projects.
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Open Token Clan Stung by IBM's Refusal to Join

BY MARK STEPHENS

The fledgling Open Token Foundation (OTF) was shaken last week by the news that IBM would not join the organization of Token Ring networking vendors.

According to IBM, which manufactures more than 90 percent of the world's Token Ring products, the IEEE 802.5 Token Ring standard is already open enough, and standards bodies other than OTF are capable of policing interoperability among Token Ring products.

"I'm discouraged by IBM's decision," said Bob Metcalfe, general manager of 3Com Corp.'s Hardware Products Division and an OTF founder. "We don't want to end up as an anti-IBM organization. We



don't want this to be another OSF vs. Unix International battle with two competing standards. My first reaction is that we should disband OTF to avoid confrontation, but that's not my decision to make, and it may not be necessary."

Despite Metcalfe's pessimism, OTF chairman Robert Madge is eager to go forward. "Our job would be much easier to accomplish with IBM's participation, and we hope that they will reconsider joining," said Madge, who is head of IBM U.S.-based Madge Networks Ltd. "But we will go on as before, working for Token Ring interoperability."

Madge said that some IBM products — including the company's PC 3270 emulation program, APPC/PC program, and See **Open Token**, Page 93

Microsoft Cofounder Works On Applications Generator

BY STUART J. JOHNSTON

The lesser-known of Microsoft's two founders is planning to release by summer a Hypercard-like applications generator for Windows that will allow novice programmers to quickly and easily generate business applications.

Asymetrix, which was started by Microsoft cofounder Paul Allen, is expected to unveil its secrecy-shrouded work in either late spring or early summer, according to sources close to the company.

The small company, which is based in Bellevue, Washington, has been involved in research and development work for the past few years.

Although Asymetrix does not plan to formally announce the product until it ships, it reportedly began showing it to analysts

and industry insiders at fall Comdex last year to get ideas on how to market it to users.

The Windows-based program provides a Hypercard-like environment within which relatively unsophisticated users can build custom business applications quickly and easily, sources said.

With the mouse, a user connects built-in icons that represent high-level functions such as spreadsheet, database, and graphics engines, creating a conceptual model of the desired application.

The program then compiles the application down into a pseudo-code that executes on a run-time interpreter.

Like Microsoft Excel, the product also takes advantage of Windows' Dynamic Data Exchange capabilities to allow it to See **Generator**, Page 93

Intel N-10 to Speed Up PC Graphics

1 Million-Transistor RISC Chip Could Be Used as 386 Coprocessor

BY MARK BROWNSTEIN
AND RON COLELAND

NEW YORK — Technical details revealed by Intel Corp. last week about its much-rumored RISC processor, popularly known as the N-10, show that the 1 million-transistor chip could find uses not only as a stand-alone workstation microprocessor but as a very high performance graphics coprocessor for 80386 systems.

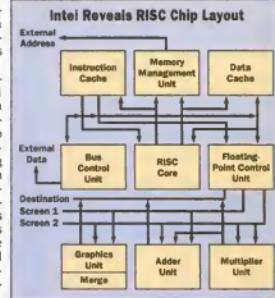
Although many questions still remain to be answered, and Intel's choreographed San Francisco press announcement is still a week away, a technical paper delivered by one of the chip's designers at the International Solid State Circuits Conference here last week disclosed many specifics about the RISC chip's complex architecture and pointed to several potential uses.

The equivalent of 1 million transistors, the 64-bit chip is based on a reduced instruction set computer (RISC) architecture. Such an architecture allows RISC chips to run faster than

chips that are constructed with complete instruction sets, such as the 80386.

A special three-dimensional graphics unit on the chip will enable the chip to provide high-speed processing of graphics data on PCs and workstations. Its impressive graphics performance is likely to guarantee that the chip will make its first appearance in high-performance CAD/CAM graphics workstations and in high-end personal computer graphics boards, industry sources said.

"The N-10 is designed to work very closely with the 386," said analyst Trevor Marshall of Yarc Inc. in Westlake Village, California.



Among the Intel N-10 operational areas is a graphics unit which can generate up to 21 million Gouraud shaded pixels per second.

"You've got an engine that could easily outperform any standard CAD workstation," stated one computer designer who saw the chip. A coprocessor See **Intel**, Page 93

Phoenix Plans Platform Bridge for Unix

'Unix BIOS' Will Let OS Work With Various Hardware Architectures

BY ED SCANNELL

AT&T and Phoenix Technologies Ltd. are expected to announce a deal in the next two weeks that lets Phoenix produce customized versions of AT&T's Unix System V.3 to run on multiple hardware platforms, according to industry sources. The agreement makes it possible for Phoenix to play a role in creating a compatible Unix mar-

ket, essentially allowing it to recreate the role it played over the last five years with its line of IBM-compatible ROM BIOS products. Those products allowed several major manufacturers to build systems fully compatible with IBM's Personal Computer series.

Under the agreement, Phoenix will create a layer of code that is the equivalent of a "Unix BIOS" that sits on top of the op-

erating system, letting it work with various hardware architectures, for example, those from Intel Corp., Motorola Inc., or Sun Microsystems Inc.

According to sources, this code would let applications run on all these platforms without being recompiled. Unlike in the microcomputer world, the notion of binary compatibility has been a foreign one to the Unix

See **Phoenix**, Page 93

AT DEADLINE

Mac Mail 2.0 to Talk to DOS Version

Microsoft Corp.'s next update of its Macintosh electronic mail program will support messaging to PCs equipped with the DOS version of the package, according to sources who have been briefed by Microsoft.

Microsoft Mail 2.0, which is scheduled to ship "before July," will add key features, sources said. A new feature will allow users to run Mail from within other applications, one source said.

Another source was enthusiastic about a feature for creating logical groups for the batch mailing of messages and the capability to "cc:" copies of a message to people other than the addressee. One source said the version would enlarge the product's market because it would support bigger installations than the original.

— Jeff Angus
Continued on Page 3

*a Stroke
of Genius ...*



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640x480 256 colors	Yes	With User Upgrade	With User Upgrade
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* Supports these standards on both interlaced (IBM 8514 and compatibles) and non-interlaced (NEC Multisync XL and compatibles) monitors.

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INFO WORLD



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Microsoft chairman Bill Gates outlined a graphical future for computing at Software Development '89 last week 8

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AT DEADLINE *Continued From Page 1*

Subsystem Puts WORMs on Novell

Expanding the storage options on Netware local area networks, Corel Systems Corp. of Ottawa, Ontario, Canada, will announce next week software and hardware that allows the mounting of write-once read-many (WORM) optical disc drives as regular server resources on Novell LANs.

Corel's \$1,995 optical subsystem will be available this spring and will consist of software drivers, a SCSI optical interface card, and documentation, according to the company. Corel's product will work with WORM drives from Pioneer, Panasonic, and Mitsubishi, supporting all security levels, log-on names, passwords, groups, trustee assignments, and file attributes common to Novell's Netware 2.15.

—Mark Stephens

Xerox Cuts Kurzweil Scanner Price

Xerox Imaging Systems recently cut prices up to 59 percent on its Kurzweil Discover product line of scanning systems for IBM PC XT/AT and compatibles.

Effective immediately, the new pricing affects the Discover Model 30, Model 20, and Model 10. The Model 30 is now \$6,995, down from \$13,950, while the Model 20 now sells for \$4,995, down from \$11,950, and the Model 10 now costs \$3,995, down from \$7,495.

—Patricia J. Pane

Intel Sues ULSI System Technology

With the legal wrangles with NEC over 8088/8086 microcode behind them, Intel Corp.'s lawyers lost no time in pursuing another case. Last week Intel filed a trade secret lawsuit against ULSI System Technology, a small semiconductor firm. The suit, filed in superior court in California's Santa Clara County, alleges that several ULSI employees, who had worked at Intel before joining ULSI, had access to specifications and other documents relating to the 80386, 80387, and an "unnamed 64-bit" microprocessor.

Intel officials said they filed a civil suit to stop ULSI from manufacturing or marketing products based on Intel company information.

Officials from ULSI System Technology were not available for comment at press time.

—Rachel Parker

Excel, Quattro Get Student Versions

Microsoft Corp. and Borland International both announced last week they will bring their spreadsheets to campus through remarketing agreements with textbook publishers who will bundle the software with courseware.

The Prentice Hall College Book Division of Simon & Schuster plans to release a \$44.95 Student Edition of Microsoft Excel, and McGraw-Hill Publishing Co. will publish the \$39.95 Quattro: The Student Edition.

The Excel release, which runs under Microsoft Windows on 80286 systems only, will have all retail edition features, but worksheets will be limited in size to 64 columns by 256 rows. Prentice Hall is developing course-specific Excel applications that will be bundled with the spreadsheet.

Quattro's student version has fewer type fonts than the commercial version of the program and lacks its SQZ compression utility, menu builder, and file encryption features, according to John Seaman, Borland's educational sales manager. In addition, the only alternate file formats the student version imports are Lotus and Dbase data. McGraw-Hill will market the program with applications and a tutorial. It runs on PC- or PS/2-compatible, floppy disk systems.

—Peggy Watt

See DOS run.



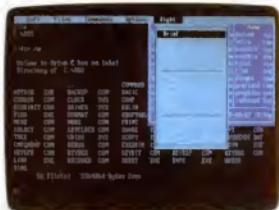
Look at DOS. It looks back at you.
It makes you do all the work.
You need the Norton Commander.



See this user-defined menu.
It runs your favorite programs and
routines at a keystroke.



View two directories—from one or
two disks—at once.
And move your files around quickly.



Pull down a menu for quick,
easy access to the full power and
features of the program.



Want a tree view? Just pop
up a window. You can scroll, mouse
or Speed Search for directories.



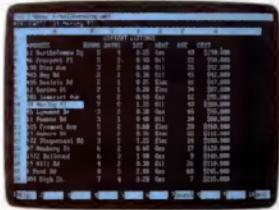
To see your files, pick a
directory on the left and see the
contents on the right.



Remember your last 15 commands?
Our Command History does.
Take your pick and run them again.



View your dBASE® II or III data
without having to run dBASE.
It's as close as a keystroke.



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out running 1-2-3 or Symphony.

See DOS run like you've never seen it before. Like you won't see it run with any other DOS enhancement shell. See version 2.0 of the Norton Commander. *InfoWorld* saw it and said it "stands out as the best on the market...a near-perfect product...recommended for all DOS users, regardless of expertise." The new Norton Commander combines the functions of a hard disk manager with all the features you need to support and enhance the DOS command line. Yet it's flexible enough to get out of your way when you don't need to see it. See your dealer right away. And see how fast DOS can run.

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COMPUTING



**The NORTON
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NEWS

Microsoft Says It Will Purchase Portion of SCO

BY SCOTT MACE

NEW YORK — Microsoft last week announced it will purchase up to 20 percent of The Santa Cruz Operation, its longtime partner in Xenix development.

SCO markets versions of Microsoft's Unix, known as Xenix, in addition to its own applications software, special installation routines, device drivers, and documentation.

Both companies acknowledged, however, that SCO Unix will continue to compete with Microsoft's OS/2, particularly in the emerging desktop Unix market. "The agreement does not put the two companies in lock-step with one another," said Harry Michaels, chairman of SCO.

"We've come up all day about what percentages DOS, OS/2, and Unix will have in the PC market, but the point is any of those numbers is significant," said Paul Maritz, general manager of Microsoft's network and Xenix group. "The correct thing to do is not to be schizophrenic about it, but to make it easy for people to feel comfortable with any one of those environments."

"SCO is in a growing field, and frankly, it needed the mon-



Bill Gates and SCO's Larry Michaels (right) said that although Microsoft now owns part of SCO, Xenix will still compete with OS/2.

ey to continue its growth," observed Pat Cubbage, a Unix analyst for Dataquest. As a \$10-million-a-year company, SCO should have cleaned up \$10 million net, but it didn't, and it couldn't get more money from its venture backers Microsoft, on the other hand, needs to keep SCO alive as its Unix engineering shop."

SCO's Xenix makes up an increasingly larger share of the Unix market, up from 40 percent in 1987 to 70 percent in 1988. Overall, Xenix shipments jumped from 45,000 in 1987 to 90,000 in 1988, twice as many Unix systems as were shipped by the No. 2 Unix vendor, Sun Microsystems, Michaels said.

Unix's move from servers to the desktop will be increased with two projects being developed together by Microsoft and SCO. The first is Presentation Manager/X (PM/X), a graphics environment for Unix systems that will feature the same user interface for SCO Xenix and SCO Unix System V as exists in OS/2 Presentation Manager.

Microsoft hasn't announced a firm date for PM/X shipment, "I would expect you to see developer's kits this year and product next year," Maritz said.

Also being developed is LAN Manager/X, a Unix version of Microsoft's OS/2 LAN Manager for SCO Xenix and SCO Unix System V.

Tandy Gives Corporate Accounts to Grid

BY RACHEL PARKER

After years of trying to sell to corporate America, Tandy Corp. effectively admitted defeat last week by turning Radio Shack's large business accounts over to its Grid subsidiary.

Since Grid was acquired nearly a year ago, its sales force has shown considerable success

selling laptops to government and field service sites, Tandy said.

In the latest reorganization of the Tandy sales force, the company will convert 61 of its more than 350 Radio Shack Computer Centers to Grid Computer Centers, redesigning the sites to accommodate product demonstrations and meetings. Retail

sales will be a minor part of the Grid Center operations.

The remaining Radio Shack Computer Centers will continue to handle sales to small and medium-size businesses, home users, and educational institutions.

Grid has tried several years to shed its hobbyist image. Without admitting its strategy has failed, Tandy said that Grid has demonstrated more experience in the corporate market.

"You've got to play your strengths," said Ed Juge, Radio Shack's director of market development. "Tandy now has a sales force that is unsurpassed in selling to government and corporations."

The two store groups will carry similar products. The Radio Shack stores will carry the complete Tandy line, including the 5000MC, Tandy's MCA-compatible system. In addition to Grid laptops, the Grid Computer Centers offer desktop systems that Tandy manufactures for Grid, Tandy-labeled PCs, and network, printer, fax, and cellular phone products.

"We want to provide more of the technologies for field systems," said Rich Lull, marketing manager for Grid.

The company said. The product includes test features and editing functions, as well as implementation tools to use panels with Desqview-specific programs. The Desqview API Pascal Library provides Pascal-language interfaces for all Desqview API functions, the company said. The \$199.95 Pascal Library supports Borland's Turbo Pascal, Versions 4.0 and 5.0 and includes source code and sample API programs as well as the API Reference Manual.

Quarterdeck is now shipping its Desqview API Panel Design Tool and Desqview API Pascal Library, both designed to complement other Desqview 2 API tools released last year.

The \$149 Desqview API Panel Design Tool provides utilities for users to interactively build panels and panel libraries that define Desqview windows in a WYSIWYG environment,

— Peggy Watt

Dbase IV 1.1 Testers Say It Will Ship on Time

Version 1.0 Has Another Round of Bug Fixes

BY MARK BROWNSTEIN

Dbase IV, Version 1.1 is in the final stages of testing and is likely to ship time in the spring, according to users evaluating the product. The update will replace the 4-month-old Dbase IV 1.0, which is again the subject of a series of bug fixes.

Ashton-Tate has posted new, complete code for Dbase IV's label and report generator modules on its BBS and on its CompuServe SIG to encourage bugs as users have encountered in Version 1.0.

The code corrects a problem in the label generator that causes code generation errors when users try to compile code for labels with A as the default driver. The new report generator code overcomes Dbase IV's inability to properly print double-spaced reports.

Both Ashton-Tate's BBS and CompuServe also include reports of Dbase IV 1.0 "anomalous" that Ashton-Tate acknowledges. (See "Bugs Uncovered in Dbase IV's SQL," January 2, Page 1.)

Version 1.1 will be considerably different from Version 1.0, said sources close to Ashton-Tate. "Version 1.0 was written for DOS. Version 1.1 was written for OS/2," one source said.

Ashton-Tate earlier said it would release separate DOS and OS/2 versions of Dbase IV 1.1. (See "OS/2 Database, DOS Update Scheduled to Ship in Spring," February 13, Page 1.) The OS/2 version is designed to run as an OS/2 native application, rather than as a DOS application in the OS/2 compatibility box.

Although much of the C code for the OS/2 and DOS versions will be the same, the OS/2 product has been engineered for OS/2 and will be reengineered for DOS, sources said.

Both the OS/2 version and DOS version of Dbase IV 1.1 will support Ashton-Tate/Microsoft SQL Server. Sources said a new command will let users exit the Dbase IV front end and connect with SQL Server on the network server. Users can pass data between the workstation and the system server, and then invoke another command to return control to the Dbase IV front end when the server session is completed.

Although sources say Dbase IV, Version 1.1 is near the end of its beta test cycle, its delivery depends upon successful certification of SQL Server. Ashton-Tate wouldn't want to release Version 1.1 if SQL Server isn't stable, said a source close to Ashton-Tate.

Mac II Programs Run Faster On Non-Apple Workstation

BY LAURIE FLYNN

Sixty-Eight Thousand Inc. released earlier this month a 68030-based workstation that the company says runs Macintosh software at several times the speed of a Macintosh II.

The vendor inserts a Macintosh II motherboard into a floor-standing case, and then swaps in a 32-MHz Motorola 68030 microprocessor. The company then accelerates the system's performance with the addition of the PRonto SCSI accelerator from Gordon Triangle, a math coprocessor, and a high-speed RAM cache.

The \$15,000 machine includes five NuBus slots and comes with a licensed version of the Macintosh system software.

The strategy of swapping a Macintosh motherboard into a non-Apple case is one already followed by Colby Systems, which markets a line of Macintosh-compatible laptop computers.

Jim Takatsuka, an Apple VAR account executive, said that while the business issues of such a strategy may be unresolved in the case of some companies, no legal problems exist.

The base system includes the 68882 math coprocessor, RAM cache, Pronto accelerator, 4 megabytes of RAM, and a 180-megabyte hard disk. Options include a RISC microprocessor, a LISP engine, and a Digital Signal Processor, as well as an Ethernet card and high-capacity RAM cache.

According to Sixty-Eight Thousand president Robert Meyer, most of his customers are interested in simply running their Mac II applications faster, rather than using the 68030-based workstation as a high-speed RISC or parallel processing machine.

Sixty-Eight Thousand Inc., 26346 Carmel Rancho Lane, Carmel, CA 93923; (408) 626-1711.

NEC/Intel Decision May Influence Other Copyright Rulings

Industry Lawyers Say Ruling May Give Clone Makers the Edge in Lotus, Ashton-Tate Look And Feel Copyright Suits

BY RACHEL PARKER

One week after the NEC/Intel ruling was announced, lawyers are finding that the long-awaited decision may have implications for other ongoing computer copyright cases.

Earlier this month, a federal court ruled that NEC's V20 and V30 chips did not infringe upon Intel's copyrights on its 8088 and 8086 chips. In reaching this

conclusion, Federal District Judge William Gray said that compatible products that are developed independently using a "clean room" procedure do not infringe upon the original work.

The ruling also held that any similarities that arise from trying to design a chip that works with functionally identical hardware reflect the limited number of choices a programmer has and do not necessarily imply copying. Intel had

granted the Japanese company a patent license to copy the computer architecture Intel used with the 8088 and 8086 but not the chips themselves.

CLOSE MAKERS MAY BENEFIT. Some computer lawyers believe that this ruling tilts the scales toward clone makers in the Lotus and Ashton-Tate look and feel suits in which they claimed that other companies copied aspects of their industry-

standard programs.

In its defense against Lotus, Paperback Software had said that it had no choice but to duplicate the Lotus 1-2-3 interface because users were demanding strict compatibility with the market leader.

"Paperback can make a strong argument that there is no difference between a microprocessor instruction set and the instructions that are executed by many types of programs," said Doug Derwin, a computer lawyer in Santa Clara, California.

Paperback president Adam Osborne said the ruling virtually assures he will beat Lotus' claim. "A command sequence is analogous to the microprocessor instruction set," Osborne said. In pretrial negotiations with Lotus, Paperback has offered to change several aspects of VP-Planner, but Lotus is demanding that the company change the instruction sequences, Osborne said.

LIMITED INDUSTRY EFFECTS. However, computer lawyers caution that specifics of the NEC/Intel case may limit how broadly the decision will be applied to the current look and feel cases. In the NEC/Intel case, the question of whether a competitor should be allowed to develop and sell a compatible product was in part decided by Intel when it licensed patents covering the computer architecture to NEC.

"At this level, where NEC has a patent license to copy the hardware, then you have to say, of course, NEC has the right to be compatible with Intel's hardware," said Ron Laurie, a computer lawyer in Menlo Park, California. With the patent in hand, NEC had a clear right to create the components necessary to building a compatible system, Laurie said.

Other companies may not have the same obvious right to create a compatible product — particularly if they move from machine requirements to user expectations. "Merely wanting to be compatible itself is not enough," said Gary Reback, a Palo Alto, California, copyright lawyer.

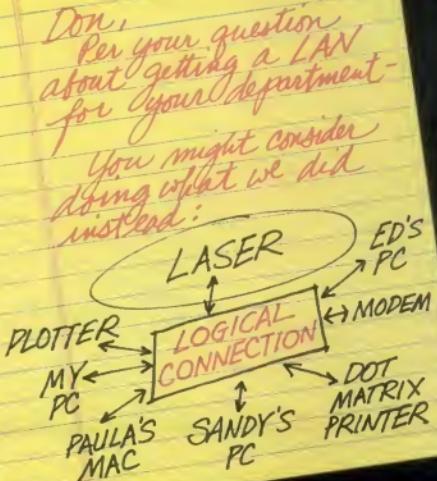
"The fact that you want your screen to look like someone else's is absolutely just a marketing decision," Laurie said. "You have opted for the design because you want to get into that market." A court will have to determine whether that kind of marketing decision is a valid reason for mimicking the user interface, he added.

AMBIGUOUS RESULTS. The uncertainty over whether the NEC ruling stands for increased copyright protection or increased tolerance for compatibility is illustrated by the fact that attorneys for both Fox Software and Ashton-Tate believe that the ruling helps their cases.

"One of the issues that concerns us is the difference between idea and expression of idea," said Stanley Wiss, general counsel for Ashton-Tate. In copyright law, only the expression of idea itself, not the underlying idea itself, "Here, the judge blurred the line in the direction of affording protection" to code that is part of a functional device, Wiss said.

Regardless of whether current cases will rely on the NEC/Intel ruling, lawyers said that it is a growing trend to recognize that some parts of expression are closely tied to the idea.

"Any who wants to make that kind of argument today is in a stronger position than he was a year ago," said Esther Schachter, a New York computer lawyer.



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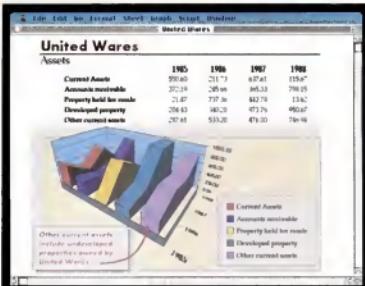
BY LAURIE FLYNN

MENLO PARK, CA — Informix Software Inc. last week announced the release of Wingz, a \$399 Mac spreadsheet it hopes will gain the attention of corporate Macintosh users needing advanced presentation capabilities.

"We believe this product begins where Excel leaves off," said Douglas Edwards, executive director of Wingz marketing, who added that he expects Wingz to sell to first-time spreadsheet buyers probably more than to Excel users.

Among the key features of Wingz are extensive graphics and drawing tools; 3-D charting with rotation and variable viewing angles; support for manual recalculation; sparse matrix memory management; allocating memory only for cells with data; cell annotation; and support for large text fields with multiple font types and sizes. With Wingz's Hyperscript programming language users can link an unlimited number of cells and files and create custom menus, dialog boxes, and control features. Worksheet matrices can measure up to 32,768 rows and columns.

In the year since Informix announced Wingz, the Mac spreadsheet market has filled more with promises than product. The release of Wingz is over a half-year later than anticipat-



Informix Software's \$399 Wingz spreadsheet for the Macintosh offers 3-D charting with rotation and variable viewing angles.

ed, and Excel users continue to wait for enhancements that will bring the program to a feature level on par with the MS-DOS version. However, in the meantime, Ashton-Tate has delivered Full Impact, which like Wingz, has a presentation graphics emphasis.

Besides Excel's installed base, a major challenge for Informix will be its appeal to corporate sites with both Macs and PCs.

At the U.S. Mint in Denver,

Excel allows a construction engineer to do much of his work on a Mac even though the company has standardized on MS-DOS systems.

Corporate users of prelease versions of Wingz are impressed with its speed of recalculations, and with its Hyperlink programming language. At Quadrant

Mortgage Consulting, for example, Wingz's programming language has allowed company president Michael Russer to quickly develop proprietary software to perform extensive mortgage calculations, a feat he said would not have been possible using Excel's macro language.

At Lockheed Missiles & Space of Sunnyvale, California, systems and network consultant Mike Bailey has advised many departments to shift from Excel to Full Impact, despite a substantial investment in the Microsoft program.

Excel product manager Dawn Trudeau said the upcoming version of Excel will address the memory limitation problem, among other things. However, she declined to say when the program will be available.

'Intelligent' OS/2 Will Display Range of Files

Gates Sees Applications Working Together

BY PEGGY WATT

BURLINGAME, CA — OS/2 will eventually provide an intelligent environment that will be able to recognize and display various file formats without needing the applications. Microsoft soft chairman Bill Gates told a group of programmers here last week.

Speaking to several hundred attendees of the Software Development '89 show, Gates hinted at an operating system that will provide object-oriented file-management features that now differ among applications. "You will not have to use the document facilities built into every application," he said.

Users will be able to describe and request information and rely on OS/2 to recognize and retrieve it, regardless of the file type, Gates said. "Any sort of information you want to store on the file can be stored, and the query system can find them. You can search at the system level," he said. "As the file system evolves, you'll think of these as stored objects."

NATIVE FORMATS. Such an operating system will also let users manipulate files in their native formats but outside of an application. This intelligent retrieval concept is also explored in two recently announced products:

Lotus' Magellan and Traveling Software's Viewlink.

"Say someone ships you an object and you didn't have that application" that created it, Gates said. If OS/2 contains the attributes of that file, it could be accessible through the operating system even without an application program.

Such features will also prompt cooperation among applications that go beyond OS/2's offer of multitasking, Gates added.

"I see it as an environment in which applications work together. It allows dedicated applications to work together in an integrated fashion," he said.

The next release of OS/2 will allow file names other than the standard eight characters with a three-character extension, consistent with DOS, and will be faster because of advanced caching techniques, Gates said.

Future versions of OS/2 will have advanced file systems that can be tailored for other technologies, such as CD ROM.

STABLE PLATFORM. "Our goal is to be as successful as we were with DOS," Gates said. "We'll be releasing updates on a regular basis after we do a few things to get a stable platform."

The upcoming version of OS/2, tailored for 80386-based systems, will support multiprocessors, Gates said. It will offer a better compatibility box for existing DOS applications because dynamic allocation of memory will give every application a full 640K. However, none of the Application Programming Interface features will change, and Microsoft plans to ship the 386 Software Development Kit this year so developers can get started.

Microsoft promises to continue to enhance and market DOS and give it some of OS/2's features when feasible, Gates said. Future versions will include file system caching, extended addresses from OS/2, more speed, address extensions, and better use of expanded memory, he said.

Oakland to Release Libraries for Spreadsheets, Graphics

BY PEGGY WATT

BURLINGAME, CA — Programming tool developer Oakland Group Inc. is scheduled to ship this spring the new libraries for spreadsheet functions and graphics development that it previewed at last week's Soft-

ware Development '89 show here.

Oakland Group's new C-Cell program provides several built-in functions and allows users to add functions from C programs for use with spreadsheet programs, according to the company. The new graphics tool, C-

Spot, is an object-oriented graphics library that assists users in building charts and defining images tied to various forms of data, according to Joseph Desantis, Oakland Group's vice president.

The C-Cell tools provide a spreadsheet interface to let users

design worksheet formulas, such as a formula compiler or @ functions, that work with data from most common spreadsheet programs, according to the company. The program can load most worksheet file formats and displays the tabular information in C-Cell's spreadsheet interface, the company said.

C-Spot, which is described as an object-oriented graphics library, is also built on top of the Oakland Windowing System, according to Desantis. The library provides the tools to implement data — either numerical or graphically — in chart form, which can be dynamically linked and changes as used model data.

Oakland Group plans to develop versions to run under OS/2 Presentation Manager and the X Window system, Desantis said.

C-Cell, including source code, will cost \$299, and pricing for C-Spot was not announced when both products ship this spring, Desantis said.

Oakland Group Inc., 675 Massachusetts Ave., Cambridge, MA 02139-3309; (617) 491-7311.

Companies Join Forces to Discuss Postscript Standards

BY BOB FORTING

Representatives of more than 50 companies, including major digital type vendors and a mix of printer manufacturers, last week joined forces to discuss Postscript compatibility standards.

Twenty corporate delegates signed on as charter members of the SPS Association, which hopes to develop an open Postscript standard.

The group assigned task forces to fully document Postscript, discuss font compatibility issues, define color extensions, and work with other standards groups, said Tom Dunn, an organizer.

Adobe sent Clinton Nagy,

national sales manager, as an observer. "We are neither an advocate of, nor opposed to, the SPS Association," he said. "We're not really sure what their goals are yet."

The organization demonstrates Postscript's momentum, said Mark Hastings, spokesman for Custom Applications Inc., a charter member. "There is a need for the imaging industry to have a standard way in which all of us can work so that output results are the same across the board," Hastings said.

Many SPSS attendees are interested in an open Postscript standard but want to be sure of the group's direction before getting more involved. Bitstream is

among those that will continue attending SPS meetings but won't yet endorse the group, said Rob Friedman, Bitstream's president. "We'll have more to say as developments in the SPS group unfold," Friedman said.

Among the companies that have signed on as full members of the group are Agfa-Compugraphic, Monotype Corp., Linotype, Letraset, RIPs, and Conographic Corp., according to Dunn. Other attendees expressed interest in its goals, but wanted to check with their corporations before joining.

"I think we will be announcing more members next week based on what people saw," Dunn said.



Microsoft CEO Bill Gates described an operating system that bridges applications.

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NETWORKING

MEMORY CONSTRAINTS

LAN Terminal Emulation Poses RAM Difficulties

Vendors Devise Strategies and Develop Emulation Products to Break 640K Barrier for Users

BY JEFF ANGUS

Experts are railing at and vendors are beginning to market around the problem of performing terminal emulation on a PC that runs modern, RAM-hogging programs.

PROGRAMS COMPETE FOR SPACE. "The memory issue is becoming increasingly important," said Leslie Lord, International Data Corp.'s senior analyst for workstations. Users may have to sacrifice running their favored

PC programs in order to connect to a mainframe, according to Lord.

"Loading even an average-size 3270 emulation program into a 640K PC leaves little room for data," she said. "In a LAN environment, this is even more of an issue because of the additional memory consumed by network operating systems and the NetBIOS interface."

VENDORS TRY TO HELP. Emulation vendor Attachmate makes one of the more memory-efficient products on the market,

said Mike New, the company's vice president of marketing, and agrees the sudden version last year of LANs among terminal emulation users launched discussion of the memory problem.

Other terminal emulation vendors, like Icot Corp. of San Jose, California, are also developing and releasing new products to address the memory concern.

According to Icot president Ken Dahl, Lotus 1-2-3 and MultiMate weigh in at a little under 300K of RAM, and Dbase and Word Perfect at close to 400K. Add the 100K for DOS and the LAN system, he said, 160K for the average terminal emulation program, and you have virtually no room left for data.

Dahl said their research indicates very few 3270 emulation-equipped PCs have any LIM EMS memory, so the 640K barrier is absolute for most users.

Icot's proposed solution is Ksaver, a 3270 emulation product that supports up to two terminal sessions and one printer session in 70 to 80K. Dahl

claims Ksaver is the most memory-conserving 3270 emulator on the market. Single-user versions list for \$750 for the SLDLC version and \$850 for the X.25 version. Icot also sells LAN gateways to support 8, 16, and 32 logical units.

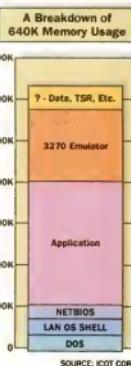
Ksaver is due to ship in early March.

FULL-FEATURED PRODUCTS OR MEMORY SAVERS. Dahl sees the terminal emulation user choosing one of two directions: either full-featured products or pared-down memory savers. Icot's Ksaver brings his company into the second market, complementing its higher-end pcPath A product.

Attachmate has taken the same strategy and is offering two products. According to New, terminal emulator vendors are forced into this strategy by the reluctance of mainstream application vendors to write tighter code.

"You have big database systems or word processors that require 425K just for code," New said. "You have a handful of utilities, like terminal emulators, desktop accessories, or

LAN Users Face Terminal Memory Shortage



LAN operating software, taking up to 60K. The discussion is centering around how we can squeeze 5K out of our 60K terminal emulation program, but never, it seems, on how we could get 5K out of the 425K word processor." □

Improved Business-Talk Accesses External Mail

BY SCOTT MACE

General Electric Information Services Co.'s private communications services now have an improved front end for IBM PCs and Macintoshes featuring text retrieval, applications design, and also messaging to external mail systems such as Profs and All-in-1.

Business-Talk, Version 5.0 lets companies or associations manage and share their own information, through searchable databases or bulletin boards, in a protected environment, said Liz Litkowski, the company's product manager of micro products.

"It also offers access to Geico's Quik-Comm system, a global electronic mailbox service, for virtually instant communications worldwide," Litkowski said.

Both the IBM PC and Macintosh versions of the program require \$12K of RAM and two disk drives (or a hard disk) for operation.

Version 5.0's text-retrieval

database service allows searches to be keyed on any word in the document.

Business-Talk users can also communicate with corporate mail products like DEC All-in-1, IBM Profs, IBM DISOSS, and Wang Office. Messages are sent and received via the International Telex Network or may be delivered to fax machines. Files can also be exchanged with any system capable of processing attached files.

A new local filing system lets IBM PC Business-Talk users store documents locally in a hierarchical filing structure.

Business-Talk, Version 5.0 costs \$20,000, including a software site license, \$4,000 of free processing in the first two months, and 12 days of consulting. Each implemented service is separately priced. Average access price for Business-Talk in the United States is \$15 to \$23 per hour, the company said.

General Electric Information Services Co., 401 N. Washington St., Rockville, MD 20850; (800) 433-3683.



Business-Talk's icon-based interface simplifies access to host applications and E-Mail services for PCs (shown) and Macintoshes.

Two PC Products Incorporate Sun's NFS

BY MARK STEPHENS

SANTA CLARA, CA — Sun Microsystems' Network File System (NFS) moved into the PC market with the announcement here last week of two PC NFS products to compete with the one already marketed by Sun's Tops division and the announcement that Novell Inc. will add NFS compatibility to

upcoming versions of its Netware network operating system.

Sun's NFS is a networking service available under TCP/IP allowing transparent access to remote file systems on the network, so users can store data on any hard disk as if it were local.

Novell will support NFS Unix workstations under Netware, said Craig Burton, Novell's senior vice president of

corporate development. Burton revealed no details on cost or availability of the product.

FTP Software Inc. of Boston, Massachusetts, announced NFS to run with PC/TCP, NFS' TCP/IP software for PCs. FTP's is the first implementation of NFS for Token Ring, supporting both IBM's Token Ring networks and Proteon's Prt Net-10, according to FTP vice president Roger Greene.

With FTP's implementation of NFS, up to four NFS drives can be mounted at one time and are seen as DOS drives. FTP's implementation of NFS will sell for \$295 when it ships in April. Shipped with a full set of TCP/IP applications, it's priced at \$500. Licenses for 20 users will be available for \$150 per NFS copy or \$230 per copy for NFS and IP.

In direct competition with FTP, Beame & Whiteside Software Ltd. of Ancaster, Ontario, Canada, announced its BNWFS, which takes only 44K of RAM and allows 24 drives to be addressed, according to company president Carl Beame. It also announced NFS server software that runs in the background under DOS, allowing PCs to act as data storage devices on NFS networks. Both products will be available this spring.

— Scott Mace

X.25 Conformance Test System Will Ensure Compliance With Standards

The Corporation for Open Systems and Idecam Electronics Ltd. of Edmonton, Alberta, Canada, have announced plans to offer an X.25 conformance test system.

The X.25 Conformance Test System (XCTS) is designed to test X.25 protocol implementations to ensure compliance with standards defined in the ISO Open Systems Interconnection (OSI) Reference Model.

The XCTS should be commercially available in the summer of 1989. An X.25 test service, using the XCTS to test implementations of X.25 products, is available at COS headquarters in McLean, Virginia.

The XCTS runs on the combination of a standard Sun Microsystems Unix workstation and an Idecam MPT protocol analyzer. XCTS tests those features of X.25 which are used in an OSI context, Berkowitz said.

"That does not include X.25 PAD protocols, used to support dumb terminals. These have been taken over by the VT protocol in OSI." A number of X.25 implementations for PCs use PAD protocols, he noted.

Berkowitz also said COS is developing an RS-232 conformance test which it hopes to complete this year.

TUTORIAL

Appletalk Standard Present In All Macintosh Computers

But Access Has Its Price: Network Software Is Slow

BY MARK STEPHENS

The fourth major networking hardware standard is Appletalk from Apple Computer Inc.

In language that makes more sense on Madison Avenue than in the Silicon Valley, Appletalk could be considered the most popular networking hardware of all, simply because it is built into every Mac Plus, Mac SE, and Mac II ever shipped. But most of those millions of Appletalk jacks lie unconnected, and many of the computers, though they are network-ready, are not networked.

When Appletalk was introduced in 1983 as the method to connect Macintoshes with Laserwriter printers, everything was called Appletalk — the protocol, the wire, everything. Today, the software side of Appletalk is still called Appletalk, but the hardware side — the wires, the connectors, and the other physical bits that work to connect the network — is called Localtalk.

LAYERED ARCHITECTURE. Appletalk is a proprietary network standard that does not conform to any IEEE specifications, but it uses a layered architecture, and its protocols at every layer have been

published, so that other vendors can develop products for it.

Appletalk, as shipped by Apple, is a baseband network with a bus topology. It operates over shielded twisted pair wire (from Apple), unshielded telephone wire (from Farallon computing), or optical fiber (from Dupont) — all at 230.8 kilobits-per-second (kbps).

YOU GET WHAT YOU PAY FOR. Compared to Ethernet's 10 million bits per second (mbps) and Token Ring's 4 mbps, 230.8 kbps isn't very fast, and that is primarily because you get what you pay for. An Appletalk port is able to be included in every Macintosh machine because the networking scheme is based around a Zilog serial chip that also runs the Macintosh modem and serial printer ports. And that serial chip is limited to about 230.8 kbps for reliable performance.

ACCESS SCHEMES. Appletalk networking software uses an access scheme that is similar to Ethernet's Carrier Sense Multiple Access with Collision Detection (CSMA/CD), except that Apple calls it CSMA/CA, with the A standing for avoidance.

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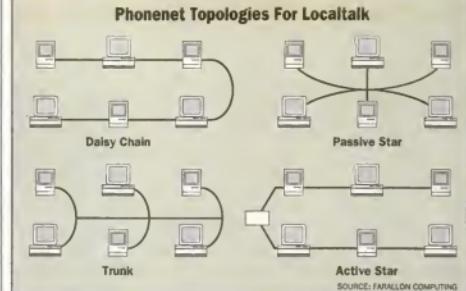
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So the T1000 can talk to your installed base of low-speed modems, plus the large installed base of Telebit[®] and other PEP[™] high-speed modems.

But it costs about the same as a



Appletalk networks were originally limited to bus topologies of up to 32 stations, but other vendors have introduced new topologies and increased network size.

Under the CSMA/CA scheme, each Macintosh on the network listens for a digital clock pulse that indicates another station is transmitting. This pulse is Appletalk's equivalent of Ethernet's carrier.

The major reason Appletalk is slow, in fact, is that the Zilog serial chip can be overwhelmed by clock pulses that arrive at rates faster than 230.8 kbps. When data is sent any faster than that over the network, Macs are prone to not detecting the clock pulse, deciding there is no traffic, and barging into conversations.

PICKING UP SPEED. Appletalk accelerator products from vendors like the Tops

division of Sun Microsystems and Dayna Communications allow more expensive, but faster, Appletalk networks.

Third-party vendors have also been able to overcome other limitations imposed by Appletalk and Localtalk networks by increasing the number of stations that can be on a subnet from Apple's arbitrary limit of 32 stations and extending the total length of a network up to 3,000 feet — as in the case of Farallon's Phenomenet.

Farallon also allows topologies other than Apple's original bus, adding stars and structured stars but not rings. As with Ethernet, ring topologies are out of the question for Appletalk.

How the competition stands

2400 bps error-free modem.

Another difference? The T1000 runs at 9600 bps with any type of data — without compression. Error free. With MNP and PEP error detection and correction.

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The T1000 Multi-Speed modem even talks Hayes — right from the box. And if you're using the AT command set or even Smartcom III software, we're compatible. You won't need new software. And you won't need new commands.

The T1000 also has internal support for the most widely-used communications protocols — Kermit, Xmodem, Ymodem and UNIX's UUCP. So you can transfer files up to 3 times faster than any other modem.



Manufacturers Display Terminal Servers at Comnet Show

BY SCOTT MACE

Terminal servers, economical means of attaching multiple PCs to LANs, were much in evidence at the recent Communications Networks '89 show.

Cisco Systems Inc. of Menlo Park, California, introduced a family of terminal servers and internetwork routers

providing connections to 4-megabit-per-second (mbps) Token Ring networks.

The new line includes a Token Ring terminal server supporting up to 96 devices, a Token Ring-to-Ethernet router, a Token Ring-to-Token Ring router, and a Token Ring-to-wide area network router using synchronous serial lines.

The four products are based on Cisco's

new 4-mbps Token Ring Interface card. Like all Cisco servers, the Token Ring units support multiple concurrently running protocols, including TCP/IP, XNS, Decnet, and X.25. They eliminate multiple backbone networks often required to run multiple protocols over a wide area network.

Available in 60 days, the Cisco Token Ring routers and terminal servers come in a four- or nine-slot chassis. Router prices start at \$14,150 for a unit with Ethernet and Token Ring connections. Examples of terminal server prices are \$1,900 for a unit supporting 16 devices, and \$20,800 for a unit supporting 96 devices.

Also at Comnet, Able Computer of Irvine, California, announced a 16-port Ethernet terminal server. The Easypoint 16 is the first terminal server with more

than eight ports to simultaneously support TCP/IP and LAT protocols. Able officials said.

The Easypoint 16 supports up to 16 attached asynchronous devices, including most personal computers, workstations, and host computers. Each device attached can establish up to four active sessions (TCP/IP or LAT) with the Easypoint 16 supporting a total of 64 simultaneous incoming and outgoing sessions.

Compatible with Decnet VMS, Version 4.0 or later, Easypoint is designed to access most standard TCP/IP host software implementations.

Easypoint supports thick Ethernet coaxial cabling.

Easypoint 16 is available 60 days after receipt of order. Prices start at \$4,500.

Intel PCEO to Ship New External Modem, Software That Supports DCA/Intel CAS

BY STUART J. JOHNSTON

Intel Corp. is shipping a new software add-in that supports the DCA/Intel Communicating Applications Specification (CAS) and will ship a new external 2,400-bps modem next month, according to company officials.

The \$495 2400EX Hayes-compatible modem supports the complete AT command set and most major communications standards — CCITT, V.22 bis, V.22, V.21, and Bell 212A/103. The modem, which works with IBM and Apple compatibles, operates at 2,400, 1,200, 600, and 300 bps.

"This is an alternative to more expensive 2,400-bps modems," said Greg Lang, product manager for modems. The modem comes with a five-year warranty and toll-free support.

PCEO's new Send-Off for Lotus 1-2-3 and Word Perfect 5.0 let

users send and receive faxes and perform file transfers without exiting the applications. Send-Off for 1-2-3 supports all current versions and is shipping. The Word Perfect add-in will ship in March.

"The add-ins will also work with other CAS-compatible hardware," Lang said. "In 1989, we will announce CAS support for Hayes-compatible modems."

The 1-2-3 add-in will be sent free to all registered Connection Coprocessor board owners. Users will need to request the Word Perfect add-in.

The company will donate Connection Coprocessor boards and accessories to the 50 largest user groups affiliated with the Association of PC User Groups. The user groups will use the boards to set up a worldwide user group network for sharing publications, articles, and information.

Intel PCEO, 5200 N.E. Elam Young Parkway, Hillsboro, OR 97124-6497; (800) 538-3373, (503) 629-7354.

Shiva's DOS Dial-In Connects DOS-Based PCs With Appletalk Networks Through a Modem

A program that allows MS-DOS personal computers to connect with Appletalk networks through a modem will ship before the end of the quarter, according to Shiva Corp.

The \$99 DOS Dial-in allows PCs the same kind of remote access the company already offers for Macs, according to Shiva.

The program has a driver for the PC that allows it to interface with Net-Modem, Net-Serial, and Telebridge,

three Shiva products.

DOS Dial-in is ideal for companies that use Macintoshes at the office and MS-DOS laptops in the field, said Shiva president Robert Brown.

Once connected to the network, the remote MS-DOS machine has access to Appleshare, Tops, In-Box, and network printing resources, Brown said.

Shiva Corp., 155 Second St., Cambridge, MA 02141; (617) 864-8500.

—Jeff Angus

up to Telebit's newest modem.

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*optional



EVERYONE'S DOING IT.

But they're not all switching to the database management system you might expect.

In a recent industry survey*, two-thirds of the respondents who intended to buy a DBMS did not intend to buy dBASE.

And, perhaps coincidentally, two-thirds of recent R:BASE® buyers have used another DBMS before.

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Because nobody really needs a DBMS; they only need what a DBMS can do.

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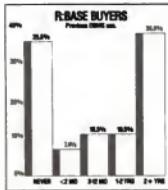
When you find that you're repeating yourself, you automate simply by recording your actions in a macro file.

Or use our application generator to quickly create complete, correct business programs without touching a line of program code.

Data is data, but information is power.

R:BASE gives you that power. And even impartial judges seem to agree: Datapro, InfoWorld, PC Magazine and Software Digest all just gave R:BASE their highest marks.

Because of its ease-of-use, R:BASE adds speed, functionality and data integrity in a combination you don't get with



dBASE, Paradox, DataEase, Oracle or any of the other contenders.

R:BASE is optimized for speed, with an intermediate code compiler that makes your applications sing. And a true compiler is on its way.

You can use its English-based language in command mode, to modify programs R:BASE writes for you, or to write your own solutions from scratch.

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And R:BASE is relational, so your rules stay with the tables—applications

can't avoid or change them. And forms can be set up to cascade changes through related tables. So you can trust the information you get.

We also give you an SQL implementation that even novices can use to create simple yet powerful queries.

And networking is free for up to three users. It's also easy, so any single-user application can be run on a multi-user LAN with a single command. And our advanced concurrency control, unlike earlier-generation auto-refresh in other DBMSs, won't bring your network to its knees when you expand with our Six-Pack or Network Unlimited versions.

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R:BASE is the second-largest selling PC DBMS in the world, and it's backed by all the training, service and third-party support you'll ever need.

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SOFTWARE

Computer Associates Targets PC Databases

By SCOTT MACE

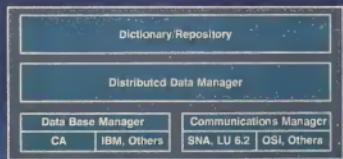
NEW YORK — Mainframe veteran Computer Associates (CA) set itself the challenge last week of catching up and passing the crowded pack of PC database vendors in the next 16 months.

In a series of position papers, Computer Associates revealed plans for PC versions of several IBM mainframe products and new CASE tools offering advanced prototyping, querying, cooperative processing, and applications portability.

"It's a major plus," said Joe Allegro, owner of CA's Application Construction Environment, CA's multiplatform answer to IBM's SAA.

Computer Associates will add ad hoc query to the DOS version of its PC-Datamax relational database, rename it CA-Datamax/PC, Release 1.0, and provide an SQL interface compatible with mainframe CA-

CA's DATA MANAGEMENT ARCHITECTURE



Computer Associates has mapped out a strategy to integrate its PC and mainframe products using SQL and distributed processing.

Datacom/DB.

Beta testing of the CA-Datamax component will begin in the second quarter, with a single-use, version of CA-Datamax/PC scheduled for release in the fourth quarter, the company said. CA-Datamax/Server, a multiuser version that supports IBM Token Ring and PC networks, will be released in the second quarter of 1990.

Other components will route CA-Datamax requests to PCs or mainframes, the company said. The mainframe component, called CA-Datamax/Star, is scheduled for third-quarter release.

Its PC component, CA-Datamax Star/PC, will provide full mainframe updates for PC

requests in a shared environment and is scheduled to ship in the second quarter of 1990, Computer Associates said.

SUPPORT FOR EXTENDED EDITION. Although initial versions will be for DOS, OS/2 versions will follow very quickly, Allegro said. CA plans to support IBM's SQL-based DB2 and OS/2 Extended Edition, he added.

A PC version of CA-Ideal, a non-procedural application prototyper and generator, is also scheduled for release in the first quarter of 1990. Computer Associates announced it will be completely compatible with the mainframe-based CA-Ideal product and through integration with the mainframe product will give PC users access to site-wide data dictionary facilities to automatically generate panels, reports, and code.

Also scheduled for release by the end of 1989 is CA-Depictor, which will run on both mainframes and PCs and provide a CASE environment for CA-Datamax.

Computer Associates' strategy was generally well-received.

GOOD CHANCE AT MARKET SHARE.

"If they deliver on the dates they've promised, they have a real good chance to get a share of the market," said James Kinder, president of Cadre, an independent CA-Datamax user group. "It remains to be seen if they can pull it off."

"What I'm most impressed with is how far they've come in a very short period of time," said George Schussel, president of Digital Consulting in Andover, Massachusetts. With CA's acquisition of Applied Data Research last October came new products, new developers, and several thousand new customers, he noted.

"CA's new product offering was based on the CA-Universes DBMS, which is not a bad product, but it had a pretty small user base," Schussel said. "In four months' time, they've managed to integrate the two product groups, install a new management team, and lay out directions for the 4GLs, databases, and the overall environment."

Screen-Capture Utility Enhanced for OS/2, VGA

Pixelpop Prepares Color Separations, Slides

By SCOTT MACE

Imagेषet Corp. recently announced a screen-capture utility that can prepare color separations and presentation graphics and works with most desktop publishing packages.

The product, called Pixelpop, is available in versions for DOS or OS/2. Pixelpop is the successor to Imagेषet's lmacap screen-capture program, the company said.

Pixelpop captures CGA, EGA, and VGA screens of most application programs for conversion into transparencies, 35mm slides, or for import into most desktop publishing applications, according to Lenny Schafer, Imagेषet Corp.'s president.

Users can then print or produce captured screens through Linotronic Imagesetters, Scitex, or Crosfield pre-press systems, laser printers, ink-jet printers, and 35mm film recorders that can accept the file formats that Pixelpop supports.

Among the formats Pixelpop supports are PCX, from PC-Paintbrush; TIFF, from Aldus

and most desktop scanners; MSP, used in Microsoft Paint; GIF, the standard for Compuserve; TGA, standard for AT&T Targa and Everex boards; ANSI, text files for text modes; and Postscript, used in most desktop publishing applications, the company said.

Images captured by Pixelpop can be fully edited by any application paint program that accepts the file format, the company said. Pixelpop 2.0 works only in a VGA-configured system.

Pixelpop is the only color screen-capture system that successfully converts computer colors (RGB) into offset press ink colors (CMYK), Schafer said.

Pixelpop costs \$148. An evaluation copy, which can save images in only one format, costs \$48, and is available directly from Imagेषet.

Imagेषet Corp., 555 19th St., San Francisco, CA 94107; (415) 626-8366.

Beckman Plans to Offer Windows Word Processor

Myriad Supports Multiple Document Editing

By BOB PONTING

Following on the heels of Samna's Ami, Beckman Associates is planning to ship in April a full-function word processing package designed specifically for Windows — only the second such program available under Windows.

The program, called Myriad, can edit multiple documents in separate windows and lets users place graphics anywhere in a document, wrapping text around the image, the company said. It uses the clipboard to move text as well as import text and graphics from other applications.

Myriad supports other high-end word processing features such as style sheets, document merge, table and index generation, headers, footers, and automatic footnote placement, the company said. It also provides graphics tools to draw lines, ellipses, rectangles, and shaded areas. Users can also create text

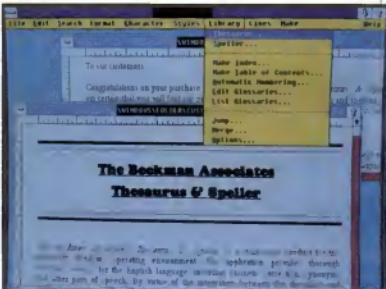
and graphic frames that are anchored to either a page position or to a passage of text.

Myriad offers WYSIWYG text editing and full-page preview. It comes with Beckman Associates' Thesaurus & Speller, which was also recently updated.

Thesaurus & Speller for Windows Version 2.1 has several spelling dictionaries, including a standard English dictionary of 116,000 words and a 140,000-word dictionary that includes medical, legal and technical terms. It supports several word processors, including Word, Windows Write, and Myriad — as well as Windows' Dynamic Data Exchange for access by other Windows applications.

Beckman Associates' Thesaurus & Speller costs \$119.95. Myriad is priced at \$249.95, and both run on PC and PS/2 compatibles running Windows.

Beckman Associates Ltd., 928 Oakcrest St., Suite A, Iowa City, IA 52246; (319) 354-5116.



The Myriad word processor uses Windows' graphical features and includes Beckman Associates' dictionary and thesaurus.

Extra K Add-In Lets Symphony Users Trade Functions for Memory Space

Lerman Associates recently announced Extra K, a memory management add-in program for Symphony users.

Extra K gives users the ability to selectively unload the four non-spreadsheet portions of Symphony (word processing, communications, form entry, and graphics) and to reuse that memory for their worksheets.

Depending on which combinations of environments are unloaded, 35K to 94K of memory can be reclaimed by using Extra K. This gives users the equivalent of up to 21,000 more

cells for their worksheets, said Jerry Lerman, president of Lerman Associates.

As an add-on product, Extra K can be invoked with just a few Symphony menu selections, the company said. Extra K requires Symphony 2.0, 1.2, or 1.1 and works with any system that runs these Symphony versions. Extra K costs \$79.95 plus \$4 for shipping and handling.

Lerman Associates, 12 Endmoor Road, Westford, MA 01886; (800) 233-4671, (508) 692-7600.

— Scott Mace

"Within a few days, SideKick Plus became even more indispensable than SideKick"

Dick Pountain, Personal Computer World

Here's what Personal Computer World had to say about SideKick® Plus:

"When the news of SideKick Plus arrived, I made up a shopping list of the improvements I would like to see ... Borland has provided all these things and much, much more."

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"I discovered that the same intelligence and elegance of design that initially attracted me are still there, and certain new features like the customizable menu system represent a real breakthrough in user interface design."

Sophisticated memory management

"Memory management in SideKick Plus is so sophisticated that it almost amounts to an alternative operating system ... The amount of memory tied up is tiny (less in fact than old SideKick!) ..."

The Phonebook: Fully-featured communications

"The Phonebook has come a long way ... For one thing, it has acquired a fully featured communications package which can work in the background; you can upload and download files while continuing to work on your PC ... The Script language is one of the best I have seen."

The Notepad: Power for serious writing

"The Notepad is as powerful as many word processors ... I would happily use it for serious writing." "Up to nine notepads can be opened simultaneously with SideKick Plus."

Outlook: The best outline processor

"Outlook is ... the best outline processor I've tried, comfortably beating ThinkTank, PC-Outline, and Ready! in elegance and ease of use."

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Hard disk required.

For the IBM PS/2™ and the compatibles family of personal computers and all 100% compatibles.
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The File Manager: Competing with the standalones

"The File Manager ... performs a similar function to standalone utilities like Xtree, Quick DOS, or the Norton Commander, and shares features with all of them."

The Time Planner: Hugely enhanced

"The Time Planner has advanced even further than the Phonebook ... it has been designed with networking in mind."

Plus a lot more

"The enhanced cut-and-paste functions are perhaps the most attractive feature of SideKick Plus ... [it] has a powerful, consistent ability to cut-and-paste from any application to any other."

"The calculator is no longer one, but four calculators: you can switch the type to Business, Scientific, Programmer, or Formula."

Positively addicting!

"In my view, the individual applications in SideKick Plus are of such a standard that I would be hard put to better them with a collection of standalone applications ... I remain an addict."

Excerpts from Dick Pountain's review of SideKick Plus in Personal Computer World, March 1988.

If you have the Intel® AboveBoard you can load the SideKick Plus desk accessories into expanded or extended memory and leave most of your conventional memory to run your other applications.

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All artwork shown was created using Desktop Publisher and Artline.

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Schedule Master Ships Employee Scheduling, Forecasting Package

BY ROBERT SHODWON JONES

Schedule Master Corp. recently released Schedule Master, an employee scheduling and forecasting package that is designed to meet the needs of a range of businesses.

The application's forecasting model permits managers to plan and schedule weekly work requirements based on historical data, said Neil Chernoff, Schedule Master Corp.'s national sales manager. Forecasting can be done using projected business activity or percentage decrease or increase in weekly requirements, he said.

Users set up the program by entering employee data such as vacation time and whether the worker is considered indispensable for a particular project, according to the developer. The program then generates a schedule by matching employee information and exceptions with work-load requirements, according to Chernoff.

Schedule Master can be set up to select from several cost-per-availability ratios. Users selecting the lowest-cost ratio, for example, would get a schedule that includes the use of employees with the lowest wages first, according to the company.

The \$995 program runs on PC and PS/2 compatibles.

Schedule Master Corp., P.O. Box 920063, Norcross, GA 30092; (404) 662-0781.

Freedom of Press 2.0 Adds Color Postscript To Low-Cost Printers

BY BOB FONTING

A new version of Freedom of Press recently released from Custom Applications Inc. (CAI) gives color Postscript capacity to a variety of inexpensive printers.

Freedom of Press 2.0 is a Postscript-compatible interpreter based on Compugraphic's Intellifont font-scaling technology, the company said. It comes with 35 Laserwriter-compatible outline fonts and supports popular laser writers and 24-pin dot-matrix printers.

The update adds drivers for Hewlett-Packard's Paintjet, Howtek Pixelmaster, and AMT, Fujitsu, and NEC 24-pin printers equipped with color conversion kits.

It also interprets Postscript files faster than the previous release, said Mark Hastings, CAI's vice president of marketing. "As a general rule, it's 40 percent faster, but in some cases it's as much as three times faster than previous versions," with the greatest speed gains in text processing, he said.

CAI offers Freedom of Press as a low-cost alternative to a dedicated Postscript printer for producing occasional documents.

Freedom of Press requires 640K of RAM, 512K of expanded memory, and a hard disk. The program costs \$495, with a \$45 upgrade available for owners of previous versions.

Custom Applications Inc., 900 Middlesex Turnpike, TMTC 5, Billerica, MA 01821; (508) 667-8585.

Squish Plus Device Driver Compresses Files

Sundog Software Corp. recently released Squish Plus, a device driver that compresses files, doubling the available space on floppy disks or hard disk drives.

Unlike archiving programs, the utility's compression technique is dynamic. It occurs invisibly and without a specific request from the user, the developer said.

Because the utility is a logical device driver, it can operate in harmony with such applications as common database managers and word processors as well as such system utilities as backup, cache,

and unfragment programs, said Kathryn Stone, Sundog's vice president.

For example, a Microsoft Word user would read or write to the driver's logical device, which could be designated as a "d:" drive. Word could then call the compressed file, and Squish ensures that the file is decompressed and loaded into Word without the application knowing the file had been compressed.

Sundog estimates users can save about 12 percent of their overhead time costs by using Squish on an 8-MHz 286-based

system, said Alfred Delio, Sundog Software's president. The compression process is CPU-intensive, and affects different systems to differing degrees.

The \$99.95 Squish Plus includes caching software. Registered users of Sundog Software's earlier version, called Squish, may upgrade for \$50 directly from the developer.

Sundog Software Corp., 2645 Court St., Brooklyn, NY 11231; (718) 855-9141.

—Jeff Angus

To learn Microsoft QuickBASIC, you only need a manual this thick.



You're looking at something you won't see anywhere else.

It's called QB Advisor. A remarkable new hypertext electronic manual that can make you instantly more productive, even if you don't know the first thing about programming. QB Advisor actually lets you experiment by cutting and pasting useful sample programs right into your programming window. Only Microsoft has it. Only Microsoft could. And it's just one of the things you'll learn about new Microsoft® QuickBASIC version 4.5 for IBM® PCs and compatibles.

Another is the step-by-step tutorial that actually takes you through every stage of programming by working you through a complete program.

And QB Express—the interactive way to learn all about your programming environment in a matter of minutes—not hours.

Microsoft QuickBASIC also comes with Easy Menus that let you develop programs with

a minimum number of menu choices. Context-sensitive Help for immediate help with error messages and variables by simply punching a key, or clicking a mouse. And a built-in debugger that lets you see exactly what your program is doing, as it's doing it.

Best of all, Microsoft QuickBASIC is packed with enough power to handle whatever problems drove you to programming in the first place. Fact is, it translates your program into executable code at an incredible 150,000 lines per minute.

Microsoft QuickBASIC version 4.5. If programming is the only way out, this is the easiest way in.



Microsoft
Making it all make sense.

Quicksoft Updates PC-Write and Gets Boost From Macros

BY MARK BROWNSTEIN

Shareware publisher Quicksoft Inc. released this month a minor update to its PC-Write word processor that fixes several minor bugs.

PC-Write 3.02 with the bug fix replaces Version 3.01. The most prominent bugs involved limited word recognition in the spelling checker and a glitch in the merge template.

Quicksoft also streamlined column formatting, repagination, and margin

definition and added support for larger letter names.

In related news, PC-Write got a boost with the release of PC-Write Macros, also a shareware product, from Simple Productions. The collection of 100 commands lets users automate such chores as envelope addressing from PC-Write data, screen-display video reversal, and overlapping instead of scrolling screens for document review. It accommodates macros for margin-setting and text-spacing, define/delete functions, and other tasks,

all with the user's choice of keystrokes. PC-Write Macros runs with PC-Write 3.0 or later versions. The macros are available as disk-only shareware and with a printed manual and updates.

PC-Write costs \$89, which entitles users to a manual, quarterly newsletter, phone support, and two free updates or utilities. Quicksoft encourages registered users to copy the product and pay a rebate when new users pay and cite another's registration number. Quicksoft is distributing the update directly and

through electronic bulletin boards.

Simple Productions distributes PC-Write Macros, and its earlier speed-up product, Writer's Heaven, on-line and directly. PC-Write Macros costs \$15 for the disk only and \$25 for a version with printed manual and support. Writer's Heaven costs \$20 for a disk only and \$30 for a version with a printed guide.

Quicksoft Inc., 219 First Ave. N., No. 224, Seattle, WA 98109; (206) 282-0452. Simple Productions, 12 E. 15th St., No. 3, Arcata, CA 95521; (707) 822-3148.

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plish by hand. Just input your data and the program automatically creates your optimum project schedule. Project Workbench also gives you unlimited "what-if" capability, strong resource management functions, context sensitive help, presentation-quality graphics and much more. There's even an Interactive Gantt Chart and Resource Spreadsheet that run on a single screen.

Software Spectrum's price for Project Workbench-Advanced System is more than \$400 below suggested retail. And our service is unmatched by any other source in our industry.

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Project Workbench is a registered trademark of Applied Business Technology Corporation.

C Programmer Toolkit Adds Object-Oriented Development for Code

BURLINGAME, CA.—Complete Computer Corp., released at the Software Development '89 show here last week an object-oriented C programmers' toolkit available both as a commercial package and a scaled-down shareware release.

"Complete C provides an evolutionary approach to object-oriented programming," said Sherly Kennedy, a company spokeswoman. Besides offering a complete development environment, Complete C can be used by programmers who want to continue to develop in C but desire some aspects of object orientation to enhance their code.

The shareware version, which includes a driver that generates executable code, a debugger that can link into run-time code, and a library of foundation classes, costs \$15. The \$269 commercial toolkit adds a production module that optimizes code for speed and size, manuals, and support for all memory models.

Both releases work with DOS 2.0 or later, and the company plans to develop OS/2 and Unix versions.

Complete Computer Corp., 111 W. 57th St., New York, NY 10019; (212) 582-2635.

—Stuart J. Johnston

Copia Ships Accsys Implementations That Access Paradox Files

A new family of software libraries designed to provide access to Paradox and DBase files from within the programs under development is being released from Copia International Ltd.

Implementations of the collection, which is called Accsys, are now available for use with C and Quick Basic development with Paradox in a single-user operation. Accsys routines for DBase IV are scheduled to ship later this month, and a multiuser Paradox version is scheduled for second-quarter release.

The Paradox version has 63 routines, some access and write Paradox keyed and non-keyed tables and index files. Accsys for Paradox with C and Quick Basic costs \$395 each for the version offering only binary modules and \$795 each including the source code. Copia says No run-time royalties are charged. DBase IV versions will be available at the same price.

Copia International Ltd., 1964 Richton Drive, Wheaton, IL 60187; (312) 665-9830.

—Jeff Angus

NEWS BRIEFS

REALIA COBOL UPGRADE INCLUDES TRANSACTIONAL FILE SHARING

Realia Inc. began shipping this month an update to its Realia Cobol optimizing compiler.

The new version, called Realia Cobol 3.10, now offers transactional file sharing with file-level locking, access to the high-level language application program interface, and expanded editing facilities, the company said. The update also provides a module that lets applications work with IBM 3270 terminal emulators without directly interacting with mainframe data formats and messages.

The Realia Cobol 3.10 package includes a compiler, editor, and debugger and runs on PC and PS/2 compatibles running DOS 2.1 or later. It costs \$995, with free upgrades to registered users who bought Version 3.0 less than a year ago or who are under Realia's maintenance contract.

Realia Inc., 10 S. Riverside Plaza, Chicago, IL 60606; (312) 546-0642.

UTILITIES FOR FRAMEWORK ENHANCE DATABASE MODULE, USE OF FILES

Software Trust recently released Power Dbase Tools for Framework III, a set of utilities that enhance Framework's database module and use of Dbase files within Ashton Tate's Framework III.

The add-in enables Framework to handle larger databases than it could previously, as well as providing such features as appending files directly from spreadsheets or other databases, browse functions, and statistical functions.

Power Dbase Tools for Framework III, which includes source code, costs \$299. For its introduction, the product will also include copies of Software Trust's Framework III Business Packs, which are templates, macros, and add-in programs for use with Framework.

Software Trust, 375 Broadway, Suite 400, Laguna Beach, CA 92651; (800) 877-2232, ext. 777.

1-2-3 ADD-IN UTILITIES RELEASED

SMI Enterprises Corp., developer of Search/Replace for 1-2-3, has added to its spreadsheet add-in products with the recent release of Worksheet Tools for 1-2-3.

The Worksheet Tools is comprised of four add-in utilities, including a cell editor, search/replace function, print controller, and interactive status screen.

The cell editor lets users choose range names and @ functions from menus, highlight each level of figures, and calculate formulas one step at a time, the developer said. The status screen is similar to 1-2-3's global status screen, but lets users make changes without stepping through menus. The print control tool displays all 1-2-3 print options on a single screen and lets users design a library of print settings for each worksheet.

The program uses approximately 60K of RAM and runs with 1-2-3, Release 2.0 or later. It costs \$49.95 for the collection, or \$18 for each tool.

SMI Enterprises Corp., P.O. Box 582221, Tulsa, OK 74158; (918) 560-9526.

RAM-RESIDENT UTILITY IDENTIFIES AREA CODES IN U.S. AND CANADA

Left Coast Software recently released PC-Areacode, a RAM-resident utility that provides a database and search functions to identify telephone area codes for U.S.

and Canadian cities.

More than 7,200 cities are in the database, the company said. The \$49.95 program, which can also run as a stand-alone, runs on PC or PS/2 compatibles. It does not require a hard disk.

Left Coast Software, P.O. Box 160601, Cupertino, CA 95016; (800) 234-0554.

JURISOFT COMPARE-RITE UPGRADED

Jurisoft Inc. has updated its Compare-Rite document-comparison program with more options to specify text review,

including footnote support.

The program reviews two versions of a document and creates a combined file that notes their differences and changes. It is used primarily in the legal and publishing fields, according to Jurisoft.

The new release, Version 3.0, can now distinguish between changed text and text that was moved within a document, the company said. Users can also designate "skip text" options so Compare-Rite will not compare certain sections of text, and compares footnotes separately.

The new version costs \$129.95 and is available now.

Jurisoft Inc., 763 Massachusetts Ave., Cambridge, MA 02139; (617) 864-6151.

TEMPLATES FOR GENIFER SHIPPING

Bytel Corp. is now shipping new software templates for Dbase-compatible Genifer application generator to support other Dbase dialects.

The optional templates, which cost \$49 each, are available for use with Nantucket Corp.'s Clipper, Fox Software Inc.'s Foxbase+, and Wordtech Systems Inc.'s DBXL and Quicksilver.

The company is also offering free upgrades to registered users of the \$395 Genifer, Version 2.0, to support Dbase IV syntax.

Bytel Corp., 1029 Solano Ave., Berkeley, CA 94706; (415) 527-1157.

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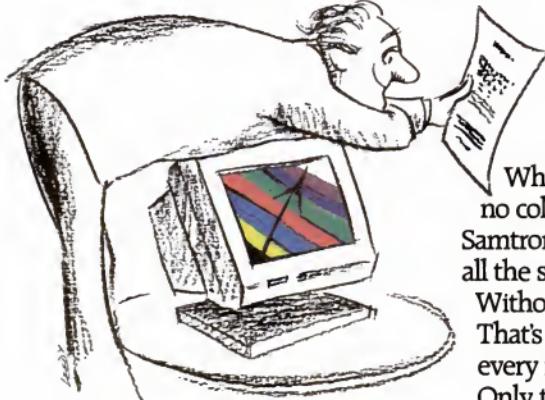
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HARDWARE



The Tempest IBM PS/2 Model 70 includes a VGA video port, one parallel and one RS-232 serial port, and 1 megabyte of RAM.

Model 70 System Added To Tempest PS/2 Line

PS/2 Compatible Is Intended for Graphics

BY PATRICIA J. PANE

Atlanta Research Corp. (ARC) has extended its Tempest PS/2-compatible product line with the T5300 PS/2, an IBM Model 70 system that has been modified to meet the federal government's NACSIM specifications.

The T5300 PS/2 is a 16-MHz 80386-based desktop system intended for graphics and other image-dependent applications running under MS-DOS or OS/2, according to a representative from ARC.

The system includes a VGA video port, one parallel and one RS-232 serial port, and 1 megabyte of RAM, according to the company. Memory is expandable in increments of 2, 5, and 13 megabytes. The 13-megabyte expansion requires an 8-megabyte memory-slot card, ARC said.

The T5300 also includes one 3½-inch 1.44-megabyte disk drive, a 102-key keyboard, and three MCA-compatible expansion slots, according to a representative from the company.

A NACSIM 5100A 12-inch high-resolution color monitor with a maximum resolution of 770 by 570 pixels is optional, the company said. The monitor lets users choose up to 256 colors from a palette of more than 256,000 colors and 64 shades of gray, according to a representative from the company.

Also optional are a 60-megabyte removable hard drive, a 3270 port adapter card, and an Etherlink II port card. A Multi-communications Protocol Adapter (MPA) Card with an RS-232 serial port and an 80387 coprocessor are also optional, according to an ARC spokeswoman.

Although prices had not been set at press time, ARC estimated a cost of \$18,000 for a T5300 system configured with the base unit, color monitor, and 60-megabyte disk. The T5300 is slated to ship next month, ARC said.

Atlanta Research Corp., 5390 Chirkowick Ave., Alexandria, VA 22312; (800) 542-5323, (703) 642-4131 in VA.

Compaticard Reduces the Cost of Adding Floppy Disk Drives

BY MARK BROWNSTEIN

The cost of adding floppy disk drives to a PC XT, AT, or compatible computer can be reduced through the use of a Compaticard or Compaticard II floppy disk controller from Microsolutions Computer Products.

The Compaticard and Compaticard II controllers allow PCs and compatibles to read, write, and format 3½-inch floppy disks and 1.2-megabyte 5¼-inch disks. Both controllers have a

half-card form factor, according to the company.

Standard drive controllers for the PC do not normally support the faster data-transfer rates of high-density drives.

The Compaticard can control up to four floppy disk drives, while the Compaticard II controls only two floppy drives. Any combination of 5¼-inch high- or low-density and 3½-inch high- and low-density drives are supported, the company said.

In addition, a "background

Chips & Technologies to Announce MCA Fixed Disk Adapter Chipset

BY RON COPELAND

Chips & Technologies Inc. is scheduled to announce today a Micro Channel Fixed Disk Adapter Chipset for PS/2 Micro Channel computers that supports MFM; 2.7 RLL; and ESDI hard disk drives through a single controller.

"This is the only controller to date that supports all three interface types on a single chip set," said Ram Gopalani, strategic marketing manager for the Chips & Technologies' Mass Storage Organization. It is also the inaugural product for Chips' new Mass Storage Organization, which will focus on hard, floppy, and optical storage technologies used in ISA-, EISA-, and MCA-compatible systems.

The MCA Fixed Disk Adapter Chipset is comprised of two integrated chips: the 82C780

Hard Disk Controller and the 82C784 Data Separator.

A complete PS/2 MCA-compatible controller can be implemented in six chips: the 82C780, the 82C784, a standard microcontroller, a ROM, and two data bus drivers. This six-chip implementation yields a 480K-per-second data transfer rate, while the IBM implementation using 30 integrated chips yields a transfer rate of 430K per second.

The 82C780 contains most of the logic needed to support the disk controller and system interface functions, the company said. It includes a data manager, a fixed disk interface, and a data formatter.

The data manager block controls data transfers between an on-board buffer of 64K of static RAM and the host or disk, supporting transfer rates of up to 6 megabytes per second over the

bus and a 20-megabit-per-second disk transfer rate, the company said.

The 82C784 companion chip provides the data separation function and an encoder/decoder circuit that handles both MFM and RLL coding schemes. The 82C784 chip also includes the required drivers and receivers for data path signaling.

"The MCA Fixed Disk Adapter Chipset is the ideal solution for disk drive manufacturers designing embedded controller drives for the emerging PS/2 market," Gopalani said.

The 82C780/82C784 Chipset is available now for sampling, with volume shipments expected in the third quarter, the company said.

Chips & Technologies Inc., 3050 Zanker Road, San Jose, CA 95134; (408) 434-0600.

Logitech Mouse Features Better Design, Tracking

BY BOB PONTING

Logitech Inc. is shipping a version of its three-button mouse with a more ergonomic design, an improved tracking mechanism, and new software utilities.

The new mouse is raised in the center and lower at the finger tips and palm for increased comfort, said product manager Charlotte Torrey. The improved tracking mechanism combines optical and mechanical technology to provide hardware resolution of 320 dots per inch (dpi).

The package includes a new ballistic mouse driver that can dynamically change resolution from 50 to 19,000 dpi. When a user moves the mouse slowly, the driver shifts resolution to give greater control over small mouse movements. The driver

also amplifies quick mouse movements, so users can cover large screen distances quickly.

Included with the mouse are more than 30 menus that let users control popular applications (such as Wordstar, Word Perfect, Lotus 1-2-3, Quattro, WP-Planner, and many others) with their mouses. It also includes Pop-Up DOS, a mouse-based DOS shell that includes a text editor, an appointment calendar, a card file utility, and file-management capabilities. With Pop-Up DOS, users can tag files with the Logitech mouse, then



Logitech's new three-button mouse combines optical and mechanical technology.

copy or delete them.

The Logitech mouse costs \$139 and comes in a version for serial ports and PS/2 mouse ports as well as a bus version.

Logitech Inc., 6505 Kaiser Drive, Fremont, CA 94555; (415) 795-8500.

Electronic Arts Mouse for IBM PC Is Bundled With Deluxe Paint II

BY SCOTT MACE

An opto-mechanical mouse for the IBM PC was recently introduced by Electronic Arts, which will bundle its Deluxe Paint II program with the mouse.

The Electronic Arts Mouse supports resolutions of up to 200 dots per inch. The two-button mouse has wraparound tactile-feedback buttons and a reverse-tapered shape that fits comfortably in any hand, said Electronic Arts' president Trip Hawkins.

The Electronic Arts Mouse has a silicon-coated ball and teflon runners that allow it to glide smoothly across any surface, requiring no mouse pad,

according to the company.

The EA Mouse is equipped with a Micro-compatible software driver including a keyboard-motor program for applications software that does not have built-in mouse support.

The program has a pop-up menu that lets the user select up to 40 different macro commands as well as preprogrammed pop-up menus for Lotus 1-2-3, Word Perfect, and Wordstar.

It features a DB-9 connector and includes a 25-pin to 9-pin adapter. It sells for \$149.95.

Electronic Arts, 1810 Gateway Drive, San Mateo, CA 94404; (415) 571-7171.

ALR Cuts Prices, Introduces Small-Footprint 25-MHz 386

BY MARK BROWNSTEIN

A round of price cuts, plus the introduction of a new, small-footprint 25-MHz 80386 computer last week marked Advanced Logic Research's (ALR) preparations for the "next generation microprocessor platform," the company said.

The ALR 25386Z system provides a 64K static RAM cache and a proprietary memory

manager that emulates the Intel 82385 memory management chip. The system is positioned to compete with the Compaq Deskpro 386/20. The ALR 25386Z will be priced the same as the Compaq computer (\$5,199).

The system features a standard VGA controller, a 1.44-megabyte 3½-inch floppy disk drive, and a total of seven expansion slots.

In addition, the 25-MHz sys-

tem includes 1 megabyte of RAM. The ALR 82385 system also supports an 80387 or a Weitek 3167 math coprocessor chip.

A serial port, parallel port, and embedded floppy disk controller are all included with the computer.

Systems that are shipped with hard disk drives include controllers that provide 1:1 interleaving and a look-ahead cache.

Finally, four half-height disk

drives are also provided for any combination of floppy or hard drives, streaming tape devices, or other half-height drives.

ALR also announced its SC386Z, a system based on the 80386SX chip, running at 16 MHz. The system is said to be the first based on the SX chip that features an 82385 cache controller, which is said to increase performance of the system over competing 386SX-based systems.

The SC386Z system has six expansion slots, including five 16-bit slots and one 8-bit slot. The SX386Z will be priced at \$2,695.

The company also dropped system prices or increased the amount of RAM on systems that were not increased in price. The ALR 386/220, an 80386-based system, has dropped in

price to \$1,995.

The Flexcache 20366DT, a desktop unit, has been reduced in price by 10 percent, to \$2,695.

The 20386 M150, with a 150-megabyte hard drive has been cut 20 percent, and will sell for \$5,995.

A 30 percent reduction in price was made on the Flexcache 25386DT, a 25-MHz system that now sells for \$3,495.

Finally, the Flexcache 25386 computer, which formerly shipped with 1 megabyte of RAM, will be offered with 4 megabytes at no increase in its \$9,499 price tag.

Larger capacity hard drives and increased memory configurations are available at an extra cost from ALR. Advanced Logic Research Inc., 9401 Jeronimo, Irvine, CA 92718; (714) 581-6770.

Rapid Ships Accelerator Board for ATs

ASAP32 Makes Graphics Applications Run 10 to 30 Times Faster

BY BOB PONTING

A graphics coprocessor board now available from Rapid Technology Corp. (RTC) can make graphics applications run from 10 to 30 times faster, the company said.

The ASAP32 is a graphics accelerator board for AT-compatible PCs designed to speed up

image processing calculations, said Henryk Szejnowski, vice president of marketing. The product includes three image processing software libraries that can be called from C programs and are compatible with Imaging Technology's ITEX software.

The ASAP32 board is built around the NEC 77230, a RISC

processor designed for digital signal processing, according to Szejnowski.

Basic mathematical and I/O routines are stored on 8K of ROM. Application-specific microcode can be downloaded to 8K of on-board RAM from the PC. The board also has two 16K buffers of dual-ported static RAM for pipelining data between a frame buffer and the graphics processor, Szejnowski said.

Two image processing programs, Imagepro from Media Cybernetics and Infrascan — support the ASAP32 graphics board, but RTC is working with other vendors to add support for the board, according to Szejnowski.

"Our main target is Autodesk and other CAD packages," Szejnowski said, "because we can do the same thing for 3-D CAD that we did for image processing."

The ASAP32 costs \$1,350 for the hardware alone or \$1,995 when bundled with the image filtering, image geometry, and 2-D transformation libraries.

RTC is also developing image compression and 3-D graphics libraries which will be available separately, according to Szejnowski.

Rapid Technology Corp., 54 Ballard St., Newton, MA 02159; (617) 244-7928.

Xerox Imaging Systems Cuts Prices On Discover OCR Scanner Systems

BY BOB PONTING

Xerox Imaging Systems recently announced price cuts of between 46 percent and 59 percent on its Discover line of optical character recognition (OCR) scanner systems.

"Given the competitive products on the market and the pricing of the new products we introduced, we felt [the Discover line] needed to be brought down in price," said Jim McNaul, vice president of strategic planning at XIS.

The Discover products work with PC compatibles and include a scanner, 68020 coprocessor card, and OCR software, McNaul said.

The Model 10, which includes a page-feed text scanner

and 2 megabytes of RAM on the coprocessor card, now sells for \$3,995, down 46 percent from the previous price.

The Model 20, which comes with 4 megabytes of coprocessor RAM, costs \$4,995, down 59 percent from the original price of \$11,950.

The price of the Model 30, which uses a sturdier flatbed scanner and can scan graphics as well as text, was cut in half to \$6,995.

All models use Kurzwell Intelligent Character Recognition software to interpret text in multiple fonts and character sizes.

Xerox Imaging Systems, 1215 Teva Bell Ave., Mountain View, CA 94043; (415) 965-7900.

Sattler, Tuszey's president. The new drive increases reliability by one-third, he said, and decreases average access time to 40 milliseconds, compared to the Seagate's average access time of 65 ms. The Kalok also has a data transfer rate that is 50 percent faster than the ST 225, he said.

The Swan XT/10 has 640K of memory with zero wait states. Standard features include parallel, serial, and game ports; an 8087-1 coprocessor socket; and an enhanced 101-key keyboard.

Tuszey also announced it is shipping a desktop model of the

Swan 386/20. The Swan 386/20 contains an Intel 80386 processor running at 20/8 MHz, Phoenix BIOS, and a RAM-15 card with 1 megabyte of RAM, the company said. The desktop version includes both an 80387 socket and an 80287 socket.

The \$2,199 386/20 also has a 200-watt power supply, four ports (two serial, one parallel, one game), a dual floppy/dual hard drive controller, and a 10-key keyboard. The system has eight expansion slots (three 8-bit, four 16-bit, and one 32-bit) and five bays (three exposed and two internal).

Tuszey Computer Products, 3075 Research Drive, State College, PA 16801; (800) 468-9044, (814) 238-1820 in PA.

CPI's Jetfont Superset Offers 150 LaserJet Fonts

BY MARK BROWNSTEIN

A set of two HP LaserJet-compatible font cartridges offering a total of 150 fonts is now shipping from Computer Peripherals Inc.

The Jetfont Superset provides fonts equivalent to Hewlett-Packard's A, C, D, E, G, H, J, L, M, N, R, Q, T, W, X, Y, and Z and contains, according to CPI. In addition, fonts provided in the company's Jetfont 12/30 are included in the Superset.

Each font cartridge uses 512K of programmable read-only memory, providing a total of 1 megabyte of font storage. Two cartridges were used to avoid font metric conflicts, which can result from using two similar fonts of the same cartridge, according to Michael Mock, director of marketing.

Similar fonts using different font metrics are located on different cartridges in order to avoid using the wrong metric by an application calling the font. This helps avoid problems with uneven character placement or irregular tab registration, Mock said.

The Jetfont Superset cartridges are compatible with laser printers that use the Canon CX or SX printer engines. The fonts are software compatible with Word Perfect 5.0, Microsoft Windows, Microsoft Word, Lotus 1-2-3, and WordStar 2000, Version 3.

The Jetfont Superset is available now at a suggested list price of \$399.

Computer Peripherals Inc., 667 Rancho Conejo Blvd., Newbury Park, CA 91320; (800) 854-7600, (805) 499-5751 in CA.

RLL Drive and Controller Offered At Same Price as MFM Version

BY PATRICIA J. PANE

Tuszey Computer Products is now offering the higher-performance RLL drive and controller on its Swan XT/10 for the same system price as the previous version equipped with MFM technology.

The company replaced Seagate's MFM drive, called the ST 225, with the 32-megabyte Kalok 330 hard drive, while keeping the system's price at \$979.

Greater reliability was the determining factor in switching to the Kalok 330, said Pete

Compucyte Inc. has released two 32-bit extended memory boards, the IRAM-2 and IRAM-8, that are compatible with systems using Intel's 80386 motherboard.

The IRAM-2, a 2-megabyte board, and the IRAM-8, an 8-megabyte board, are both designed for use with Intel's ISBC 386 AT system board, according to Compucyte. The boards use a dual-bank alternating memory addressing scheme and function like Intel's MEMO20 and MEMO80 extended memory boards, according to the company.

The IRAM-2 may be popular

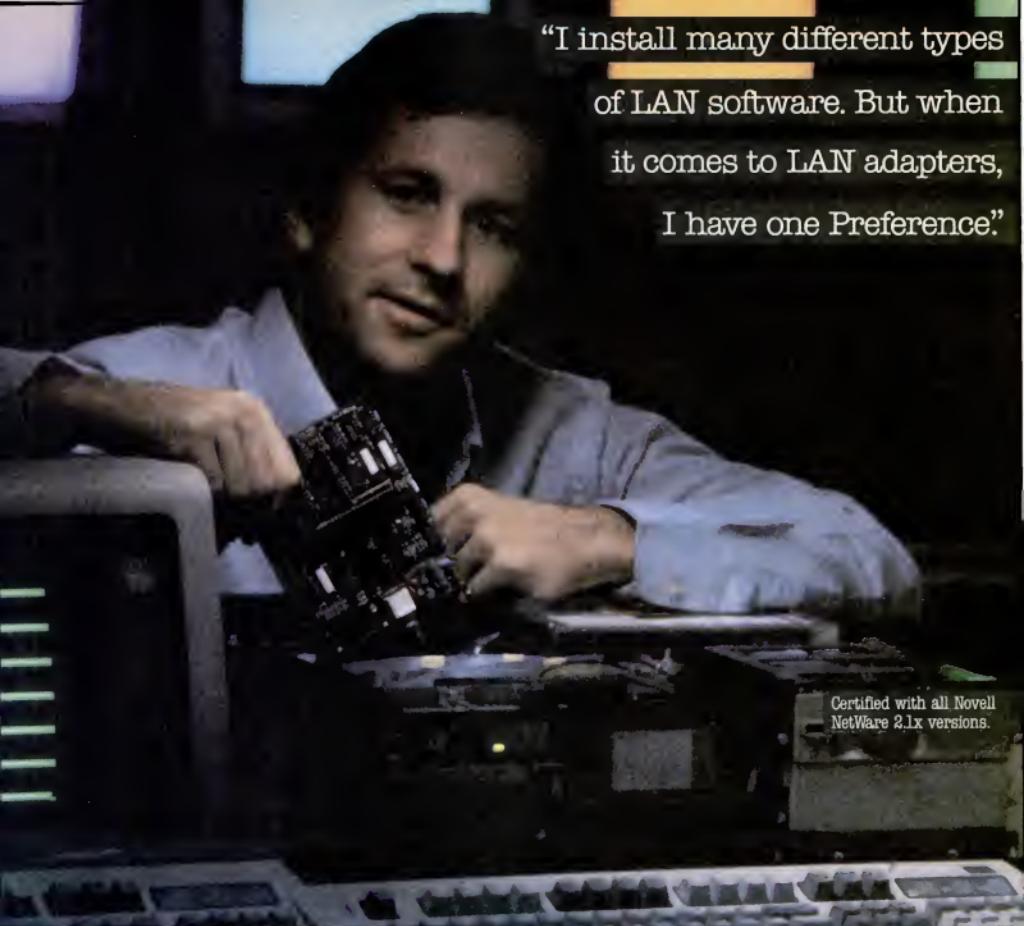
labeled with standard 256K by 1 DRAMs, and the IRAM-8 with 72 1-megabit by 1 DRAMs, according to the company.

Both boards are available immediately and can be purchased with or without memory, according to Compucyte. The IRAM-2 sells for \$1,295 with 2 megabytes of memory and for \$295 without memory. With 8 megabytes of memory, the IRAM-8 retails for \$3,495, and the unpopulated board sells for \$395, the company said.

Compucyte Inc., 246 Mill Road, Yaphank, NY 11980; (516) 924-1618.

— Patricia J. Pane

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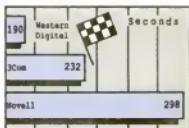
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TECH TALK ■ By STEVE GIBSON

386 Processors Offer Solutions for RAM-Gobbling LANs

InfoWorld's February 6 Networks Target Edition contained an interesting story about the amount of main system RAM being consumed by networking software. (See Page 110.) It discussed the problems of LAN users and LAN system administrators who are trying to run modern, RAM-hungry programs in what little memory is

left available after the networking software is loaded. I really began paying attention when I read that one of these systems only leaves 300K of memory available for applications.

Since my own "Steve's Dream Machine" gives me a full 602,784 bytes of free RAM after loading the Novell LAN network redirector and a passel of home-grown and commercial resident programs, I decided to share some of my

solutions.

To regular readers of this column, my use of the term "Steve's Dream Machine" is an immediate tip-off that we're dealing with a most-bang-for-the-buck system with an 80386 processor at its heart. Even though more than a year has passed since I declared Mylex's 386 motherboard to be the industry's best solution, my declaration stands unaltered. In the past year I've taken many opportunities to experiment

with alternative motherboard designs and architectures. None has matched the Mylex's performance for anywhere near the price.

It comes as great news that Mylex has been busy this past year responding to the marketplace's many demands, with speeds of 16, 20, 25, and 33 MHz; simultaneous on-board support for both the 80387 and 47650 math coprocessors; 8-, 16-, and Intel-compatible 32-bit bus slots for peripheral and memory expansion; and main motherboard RAM of 1, 2, 4, and 8 megabytes with further full RAM-speed expandability off the motherboard. It even offers a stunning XT-footprint board for old-system upgrading.

This would be of only academic interest if Mylex's prices weren't so stunning. A high-volume retailer can purchase a 1-megabyte 16-MHz 386 motherboard from Mylex for around \$1,200. If you're considering systems for in-house use or for resale, you might look at Mylex's stunning motherboards. If you're an end-user looking for an inexpensive path into 386 computing, find a box with a Mylex heart. Mylex is located at 47650 Westinghouse Drive, Fremont, CA 94539, (800) 446-9539, (415) 657-7667 in CA.

OK. So the point of all *that* is that 80386s should no longer be viewed as a solution for the elite. When you're paying only a very small premium over fast AT systems, a 386 can be a godsend. Why? Let's take the case of networking software RAM overhead.

In a typical IBM-compatible system, many regions lying between the 640K point and the infamous 1-megabyte boundary are completely unused. IBM reserved this space for alternative display devices and other I/O peripherals. Unfortunately, the locations occupied by these I/O devices are not dynamically allocated from the top of memory down at boot time (which would have been staggeringly wonderful) but instead occupy fixed locations in the high-memory region.

As a result, large discontinuous regions are available to hold other software. However, two things are required before resident software can be loaded up there. First, we need to fill these "dead zones" with RAM, and second, we need a special software loader that is able to trick DOS into temporarily believing that the lower 640K of RAM is already filled and then allows it to load a TSR up above. With the proper software, the 386's memory-mapping architecture makes all this possible.

In my system, 386-to-the-Max — my favorite memory manager from Qualitas Software ([301] 469-8848) — performs these tasks. It loads my resident software, including the Novell network TSRs, into the unused addressing spaces above 640K.

Even the size of DOS itself can be minimized by using the CONFIG.SYS file to reduce DOS' internal storage buffer count to three. Then, resident disk caching programs is loaded into high memory to replace the buffers that no longer occupy lower memory. The resulting system leaves more than 600K available for conventional applications with full networking support.

Steve Gibson is the developer and publisher of Spin Rite and president of Gibson Research Corp. of Irvine, California. The views expressed are his own.

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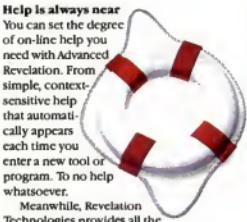
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MACINTOSH NEWS



Colorkit lets users store and manipulate 24-bit color images on a Mac II with Data Translation's Quick-Capture card.

Program Lets Users Store 24-Bit Images on Mac II

BY JEFF ANGUS

Software just released by Data Translation lets users store 24-bit color images on a Mac II equipped with the company's 256-level Quick-Capture video grabber card.

When a user attaches a Mac II equipped with the Quick-Capture board to an RGB video camera or a still-video source, he or she gets a real-time image for focusing the camera and can capture the focused image in less than a second.

The software, called Colorkit, then permits the user to achieve better color imaging in the captured file through five color-mapping routines: Uniform mapping evaluates each color in the image and assigns it to the closest analog in the 256-color world of the Mac II

monitor; biased mapping is uniform mapping with slight changes for improving skin tones; dithered mapping enhances the number of apparent colors; adaptive mapping enhances the gradations of the most commonly appearing colors; and monochrome mapping converts 24-bit color into a 256-level gray-scale image.

Although designed for use with Data Translation's Quick-Capture board, Colorkit can also be used with any stored 24-bit image, the company said.

Colorkit is \$295 and Quick-Capture is \$1,595. Data Translation also distributes Avalon's \$695 Photomat software for retouching images, which can be used with Colorkit.

Data Translation, 100 Locke Drive, Marlboro, MA 01752; (508) 481-3700.

Apple Stages Comeback For Its Apple Fax Modem

BY LAURIE FLYNN

Four months after being pulled off the market, the Apple Fax Modem staged a comeback last week with enhanced software and hardware.

Apple had discontinued sales of the modem last October when it discovered it was incompatible with some Group 3 devices, primarily fax machines from Pitney-Bowes. Version 1.2 fixes that incompatibility and also addresses other glitches, such as a tendency in some cases to have character collisions, according to a company spokesman.

In the latest version, Apple added a few new features, including the capability to send to more than one location and improvements to the "In Care Of" feature for distributing additional copied within a geographic

region. Version 1.2 also supports multiple paper sizes and is compatible with Mac System Software 6.0.3.

However, in order to transmit documents in the background, the modem requires additional third-party software such as Backfax from Solutions International of Williston, Vermont.

The price of the Apple Fax Modem remains \$699. Version 1.2 is available free of charge.

The problems that caused the modem to be pulled from the market were only the most recent of glitches that have plagued the product. Apple's release of the modem last summer was almost a year later than originally announced.

Apple Computer Inc., 20525 Mariani Ave., Cupertino, CA 95014; (408) 996-1010.

■ MARKET UPDATE

Observers Predict Mac Sales Gain

Cite Rebates, Price Drops, New Machines, but Skepticism Remains

BY LAURIE FLYNN

Despite some lingering skepticism, Macintosh buyers and industry observers expect rebates and price drops, coupled with the promise of new machines on the horizon, to boost sales of the Macintosh.

"Apple has to be both price-sensitive and brilliant," said Tim Czeleski, a Mac consultant in Seattle and formerly the president of the Southwest Business User Group. "Lowering the prices and [offering] the rebates are going to do a lot to reposition Apple in the volume buying business," he said.

"I'm looking at the new products I want to be convinced," said David Van Doren, an analyst at Shearson Lehman Hutton. "But they're doing all the right things on the demand side. They need a high-horsepower 68030 box, like a 25-MHz machine with cache memory."

"They're giving the file server business to Compaq right now," Van Doren said. "[File server] software written for 68030 just isn't as good as that

written for 386 machines."

HIGH-HORSEPOWER MACHINE. Apple is expected to respond to that call for a Mac file server in August with the release of a 68030-based tower-type model. Next month, the company plans to announce a three-slot version of the Mac IIx, which some analysts expect will be a big seller, and the ever-expected laptop Mac II slims for later this year. (See "Apple Hopes to Introduce Portable Mac This Summer," February 6, Page 1.)

At Owens-Corning Fiberglas, systems engineer William Corbin expects the Mac IIx to be a big seller among engineering firms (who tend not to use all the Mac II's expansion slots)—providing it arrives with an aggressive price tag. But September's price hike has left him skeptical.

"Now there's a greater variety to choose from," said Leonard Wines, president of the 1,700-member Los Angeles Mac User Group. "People are in love with the machines despite the company."

MARKET VIEW. Retail sales watcher Storeboard Inc. reported that

U.S. Installed Base Of Macs as of the End of 1988

Mac Ix	27,000
Mac II	177,000
Mac SE	456,000
Mac Plus	451,000
Mac 128, 512	719,000

SOURCE: INTERNATIONAL DATA CORP.

Apple's dealer sales dipped from 33,076 units in August to 28,919 in October, and to 16,618 in November. Dealer sales recovered slightly during the Christmas buying season, totaling 31,558 units in December. Not surprisingly, retail purchases of the Macintosh SE eclipsed those of either the Macintosh II or IIx as well as the Mac Plus by about double.

As of the end of 1988, Apple had achieved an installed base of 1.8 million Macintoshes (2 million counting the installed base of the Lisa and the Macintosh XL), according to figures released by International Data Corp. of Framingham, Massachusetts.

KnowledgeSet Program Locates CD ROM Graphics

Moving from DOS- and Unix-based workstations to the Macintosh, KnowledgeSet Corp. recently released search-and-retrieval software for locating data stored on CD ROMs.

The software, called Graphic KRS, is optimized for applications containing both text and graphics, allowing users to pan and zoom as well as conduct Boolean searches and other text searches. The software offers Hypertext-based links, a dictionary, and bookmarking.

By supporting Macintosh machines in addition to PCs and Unix machines, KnowledgeSet can more fully meet the needs of its customers, which often have multiple architectures, according to Chris Bowman, who is the company's director of marketing.

Graphic KRS costs \$75 per copy made, \$125 for an annual subscription fee, or \$300 per workstation. An optional maintenance contract is available for \$40 per year, according to the company.

KnowledgeSet Corp., 888 Villa St., Suite 500, Mountain View, CA 94041; (415) 968-9888.

—Laurie Flynn



The Mac Guide USA CD ROM includes listings of 4,000 available Mac products, accessible through a Hypercard interface.

CD ROM Disc Contains Mac Product Listings, Reviews

A CD ROM disc for the Macintosh that allows users to view demonstrations of Macintosh software and read product reviews as well as provide 450 megabytes of storage is now available from Mac Guide.

The Mac Guide USA CD ROM includes a complete listing and, in minutes, a review of approximately 4,000 available Macintosh products. The listings are accessible through Hyperguide CD, a keyword-searchable Hypercard stack, ac-

cording to the company.

In addition, approximately 300 Mac programs are demonstrated on the disc, which also includes a listing of Macintosh user groups throughout the United States, according to Mac Guide.

Mac Guide USA has a suggested price of \$99.95. Mac Guide, 550 S. Wadsworth Blvd., Suite 500, Lakewood, CO 80226; (303) 935-8100, (800) 877-9100.

—Mark Brownstein

UNIX NEWS

Prime Computer Puts CAD Tools On the Sun 386i

BY MARTIN MARSHALL

Prime Computer has ported its Personal Designer CAD packages to run in the Sun 386i operating environment. Databases created by the new software will be compatible with databases created using the DOS versions of the CAD packages, the company said.

"We will be offering Personal Designer's 3-D capability in both the DOS and Unix environments, while assuring the two versions are database compatible," said Lee Minardi, director of marketing for Prime Computer's CAD/CAM group.

Users will not need to perform a database conversion or translation process to access the same database using either the DOS or Sun OS versions of the packages. The user interfaces are also identical, so no retraining is needed, the company said.

Putting the CAD packages on the Sun 386i will give users increased networking capabilities, faster processing, and the capability to handle more complex applications, Minardi said.

The Personal Designer pack-



Prime has ported its Personal Designer CAD packages to run on the Sun 386i, keeping the data files compatible with its DOS files.

ages that Prime expects to ship in March are the Micro CADDSS Geometric Construction and Detailing, Micro CADDSS Surfaces, and the User Programming Language.

The Micro CADDSS Geometric Construction and Detailing package provides extensive construction and editing tools for 3-D wire-frame models, as well as features for dimensioning and annotating engineering drawings. The Sun 386i version is priced at \$2,800.

The Micro CADDSS Surface package is an add-on package that creates both 2-D and 3-D curves and surfaces. It also

calculates planar sections and the intersections of complex sculptured surfaces. Full-sized color pictures of the surface models can also be created and displayed. The package will be priced at \$2,800.

The User Programming Language package is a high-level language that allows users to create interactive programs for automating design and drafting procedures, design family trees for families of parts, and customize the user interface. It lists for \$500.

Prime Computer Inc., Prime Park, Natick, MA 01760; (508) 655-8000.

Software Links Unix System, Atomic Clock

BY MARTIN MARSHALL

Precision Standard Time Inc. recently placed in the public domain software that synchronizes nodes on a Unix TCP/IP network to the atomic clock the U.S. government uses to keep official time.

On Unix networks, a number of time-sensitive applications require careful synchronization, both between network elements and in relation to an absolute time standard.

"In applications ranging from factory data collection to stock trading, computer clock inconsistencies can cause measurable losses in productivity, efficiency, and capability," said Larry Kubo, the company's vice president of marketing.

Now those inconsistencies need not occur. The software continually synchronizes nodes on a network to within 100 milliseconds of the atomic clock at the National Institute for Standards and Technology.

The software runs on hosts with UC Berkeley's BSD 4.3 Unix or with Sun OS. Version 4.0 is accessible from Precision Standard's Time via modem link or UUCP download.

The software consists of the University of Maryland's Time Demon, "ntp," which implements the Network Time Proto-

col and synchronizes the host computer to Coordinated Universal Time, the international time standard. The software can be operated with or without a Time Source radio receiver sold by Precision Standard Time.

"Without an external time standard, however, no provision exists to correct inaccuracies caused by the drift of computer calendar clocks or by errors introduced in manual clock setting," Kubo said.

Time Source radio receivers are priced starting at \$695.

Precision Standard Time Inc., 105 Fourier Ave., Fremont, CA 94539; (415) 656-4447.

Digichannel PC/Xe Multiport Board Speeds Information Flow From Host

BY MARTIN MARSHALL

Coming in four-port or eight-port configurations, the Digichannel PC/Xe multiport board, now shipping from Digiboard Inc., uses an onboard microprocessor and local RAM to speed the flow of information from the host computer to the terminals.

The AT-bus-compatible board supports all major versions of Intel-architecture Unix, including SCO Xenix System V, Interactive's 386/ix, and AT&T's Unix System V/386 and V/AT.

An 8-MHz 80186 on-board processor allows the board to keep up with up to 9,600-bps communications per channel through RS-232 ports.

Each board has 64K of dual-ported RAM that can be read or written to by either the PC/Xe processor or the host computer. At the same time, 16K of local program memory are available to the 80186 processor. The 80186 processor can also address memory in the host CPU that is above the normal 1-megabyte limit defined by DOS.

The four-port version is priced at \$695, with the eight-channel version priced at \$995.

Using the included Digitarware drivers, up to four PC/Xe boards can be installed in the host system, giving a maximum number of 32 users connected to the host.

Digiboard Inc., 6751 Oxford St., St. Louis Park, MN 55426; (612) 922-8055.

Toshiba Announces Portable Unix System

T5200 CWS Has 100-Megabyte Hard Drive

BY MARTIN MARSHALL

Toshiba plans to emphasize Unix portability with its announcement this week of an 18-pound 386-based portable, the T5200 Corporate Workstation, according to the company.

The new system should help address the demand for a portable Unix workstation, Toshiba officials said, because it more adequately meets the operating system's need for greater hard disk capacity and expanded main memory.

The T5200 CWS will begin shipping in April, according to Donald P. Anderson, vice president of Advanced Systems at Toshiba America Inc. It sports a 100-megabyte 3½-inch hard disk drive that was recently introduced by Connex Peripherals. "People found that a 40-megabyte hard drive doesn't take you very far in the Unix environment," Anderson said.

In addition, the machine features a 20-MHz CPU, built-in VGA graphics and RAM expansion from 2 to 8 megabytes. It also has 32K of fast-cache RAM that enable the system memory to keep up with the 20-MHz CPU.

The VGA graphics built into the system is translated into 16 gray scales on its gas-plasma monochrome display, and there is a port for connecting to an external color VGA display.

Toshiba bundles DOS with the system, but it sees Unix as an important market for the machine. "Our intent is to address the corporate market with a portable business machine that runs Unix and performs at the workstation level," Anderson said.

The company is making three versions of Unix available for the system. The expandability to 8 megabytes has become important with the advent of the "merged Unix" represented by Interactive's Release 2.0 of its 386/ix operating environment, as well as SCO's Xenix, Release 2.3. The T5200 CWS will also run T/PIX, Toshiba's version of AT&T's Unix System V, Release 3.2.

All three environments are capable of running applications meant for either Xenix or AT&T's System V/386, but the price the user must pay is a larger memory requirement.

With the new releases, 4 megabytes of RAM become a common environment for running multiple applications.

"The machines will also run the older versions of Xenix that fit within 2 megabytes," Anderson said. "That makes 4 mega-



With a 100-megabyte hard disk, 8 megabytes of RAM, and VGA, the Toshiba T5200 CWS is a portable Unix workstation.

bytes a reasonable configuration."

The user can add memory using SIMM (Single In-Line Memory Modules) strips at a cost of \$1.29 per each additional 2 megabytes.

The T5200 CWS features two serial ports and two expansion slots. One is a full AT-bus slot, while the second is a half-AT XLT slot similar to that on the T5100.

"A key element of this offering is that the customer will be able to communicate from a remote site with mainframe and minicomputer databases, as well as access them locally through a CD ROM or WORM," Anderson said. "Many of these database applications are Unix-based."

With an 8-port card in the AT slot, two serial ports, and the host terminal, the system is capable of supporting up to 11 users at a remote site, Anderson said.

The basic system, with 2 megabytes of RAM, will be priced at \$10,995, including the 100-megabyte hard disk. MS-DOS comes with the machine, while Interactive's 386/ix is \$595, SCO Xenix 2.3 is \$495, and T/PIX is \$495, according to Anderson.

Toshiba will also demonstrate an X Window System support module for the machine at Uniforum later this month, but it has yet to determine price or delivery of the module. In addition, Toshiba will demonstrate an Ethernet card with System V.3.2 extensions, and a SCSI card that supports an external CD ROM or WORM drive under Unix.

"We expect to sell a complete CD package, including the SCSI card and the CD, for about \$2,000," Anderson said.

Toshiba America Inc., Advanced Systems, 9740 Irvine Blvd., Irvine, CA 92718; (714) 583-3215.

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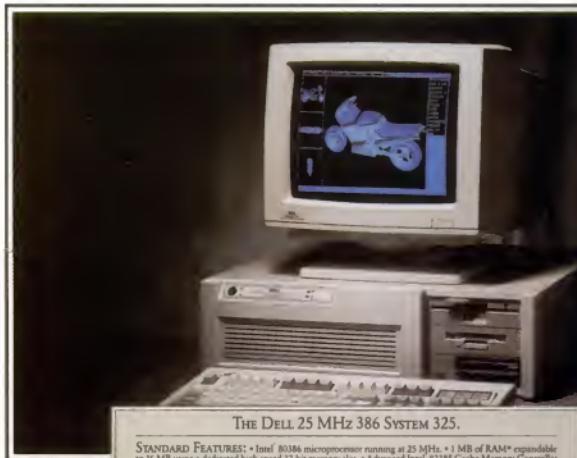
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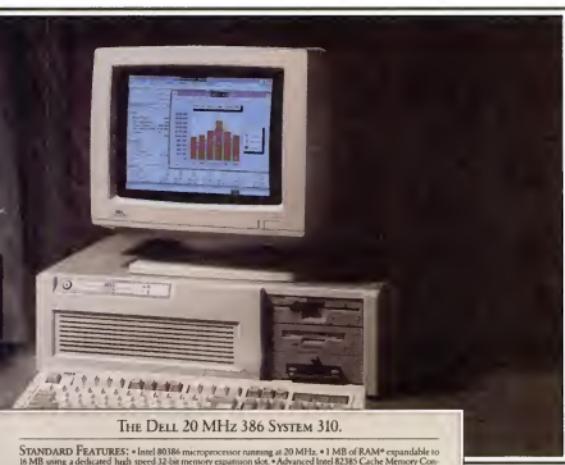
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INDUSTRY

REORGANIZATION

Apple's New Structure To Foster Fast Growth

Allan Loren's Rise Signals Shift in Strategy

BY LAURIE FLYNN

T-shirts and weekly beer bashes aside, Apple Computer Inc. bears little resemblance to what it was a year ago. But it's the meteoric rise of former MIS heavyweight Allan Loren that has the attention of observers, signaling the entrenchment of Apple's new organization.

DRAWN AND QUARTERED. In August 1988, Apple CEO John Sculley quartered its management team into distinct operating divisions, along a "functional" model to accommodate rapid growth.

As part of this reorganization, Sculley appointed four divisional presidents. The clear winners were Jean-Louis Gassee, the mastermind of Apple's product development activities, and Loren, the relative newcomer who was given responsibility for Apple USA — all U.S. marketing and sales.

Like most corporate maneuvering, Apple's changes left casualties. The most apparent is Charles Boesenberg, who recently left Apple to head the sales and marketing activities of MIPS Computer.

NEW KID ON THE BLOCK. Loren's rise reflects Apple's drive to become part of the traditional corporate computing world. At Philadelphia-based Cigna Insurance, Loren oversaw the company's information systems functions through three corporate mergers, giving him a unique vision of the changing role of MIS. That vision is one of a growing emphasis on systems that permit flexibility and change and includes the participation of managers from manu-

facturing, marketing, and virtually every other aspect of a business. "The traditional MIS person is under tremendous pressure," said Loren. "Management is looking to the [MIS department] for value."

Loren joined Apple in the summer of 1987 as vice president of Apple's Information Systems and Technology (IS&T) group, and soon became head of the newly formed Apple Integrated Systems (AIS) division, the first to incorporate Macintosh corporatewide systems.

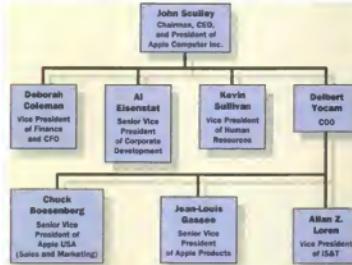
While Apple is banking on AIS as a way to increase credibility in MIS departments, Loren insists it is not shifting toward a direct corporate sales strategy. Apple has had direct relationships with the same roughly 75 organizations for several years, and at least half of those accounts are inactive and the other half buy through dealers, said Loren. With AIS, Apple plans to build partnerships with systems integrators, with Apple filling in gaps.

Still, Loren encourages direct relationships, stopping short of selling to additional corporations, and he can often be spotted with customers visiting Apple. "When I was a buyer of IBM technology, I never understood what IBM's strategy was, so I went to Armonk to get briefed. There's no substituting for direct contact."

REORG TO DEATH? Some analysts have blamed confusion stemming from reorganizations for Apple's massive misjudgment of the DRAM market.

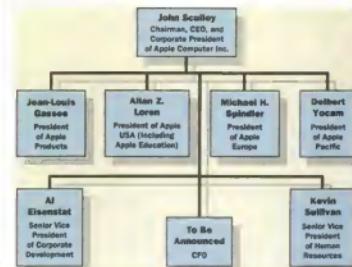
"I think you can safely say that management sort of lost track," said Doug Van Doren, an analyst with Shearson Leh-

Apple's Organization a Year Ago



Apple's Organization Now

With Four Operating Divisions



In its August reorganization, Apple "flattened" its hierarchy, so heads of sales and development report to chairman John Sculley.

man Hutton. He adds that Apple's new functional organization will accommodate fast-paced growth better than the old product-oriented structure.

Loren, who like the rest of Apple is eager to get the second-quarter drop behind him, defended the changes.

"When you see a company growing in the market and there's no change taking place at all, then you have to worry," said Loren. The new organizations are "all in response to what we think our customers are going to need and what they need now." □

Ashton-Tate Adopts Takeover Defense Amid Rumors

BY RACHEL PARKER

TORRANCE, CA — Amid widespread rumors of a possible hostile takeover in the works, Ashton-Tate last week announced it had adopted a shareholder rights plan, a popular takeover defense device.

The plan, much like Lotus' plan announced last year, is a two-step process. The first plan, commonly called a flip-in, is triggered if someone acquires or announces an intent to acquire 15 percent of the stock. Then, shareholders can exercise a right to buy additional shares of common stock, at \$105 per

share. This right increases the number of Ashton-Tate shares on the market, raising the number of shares — and money — needed to control the company.

The second step, often called a flip-over, takes effect after a take-over bid is initiated and entitles rights holders to acquire 20 more worth of shares in the acquiring organization.

"If shareholders sell their stock and keep their rights, we would end up with lots of shares in the acquiring company," said Stanley Witkow, general counsel for Ashton-Tate. Such a result would make any would-be raider think twice.

The Ashton-Tate rights plan, approved at a Friday board meeting, follows a particularly intense week of speculation over whether the company might be the subject of a corporate takeover. At \$22 per share, Ashton-Tate trades at 14 times its earnings at the low end of the PC software category, according to David Bayer, a software analyst with Montgomery Securities in San Francisco.

"From the financials, the company is certainly interesting as a buyout candidate," Bayer said. But Witkow said that the rights plan was not a reaction to either rumored or actual take-

over threats.

"Don't read much into this. It is simply the prudent thing to do," Witkow said, adding that he did not know of any existing acquisition proposals.

Bayer added, saying that the buyout probably wants to buy time to negotiate a good deal, not discourage all interested parties.

"Ashton-Tate management would probably prefer to work things out on its own," should it receive an offer, Bayer said. "But if at some time stock valuations go extremely low, they have to look at shareholder value in those shares."

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STATE OF THE INDUSTRY ■ BY RACHEL PARKER

The Industry Needs to Dedicate Itself to a Service Orientation



Across the land, businesses are proclaiming their commitment to service, and by all indications the personal computer industry is close to making that claim.

Perhaps based on the success of Nordstroms, the Seattle-based department store chain, businesses and business analysts have pronounced service is the way to avoid price wars and their attendant slim margins. While a service-oriented store's profits climb, customers also become dedicated to the store or vendor who listens to their needs. It becomes a cycle of paying a bit more for the attention that makes the customer feel good about spending more.

The PC industry is no exception in this trend toward paying attention to customers. For years, Apple Computer Inc.'s John Sculley has said that the turnaround at Apple would be customer-driven: The company would supply the products that customers demanded — not those that fit into some engineer's vision of what they should use.

The commitment to service is heating up, though, with a closer scrutiny of the point where service is most crucial from the manufacturer's viewpoint: when the customer evaluates and then buys the computer. Apple, IBM, and even dealer-committed Compaq have recently flirted with more direct sales. As products become more sophisticated and at the same time dramatic changes become rarer, manufacturers are seeing that assuring a high level of customer service at the dealer level may be the difference between selling one box and equipping an entire division.

It is a difficult proposition — especially for companies that have a long relationship with dealers. There is a strong inclination to do it yourself — to take the customer away from the dealer and surround him with the expertise and resources of the manufacturer. It is an especially tempting move because many corporations would prefer to deal directly with the vendor. In addition to eliminating the middleman pricing layer, buyers appreciate that their comments won't be filtered through a channel, lost in some network of the organization, or forgotten entirely by the dealer representative who has discounts, soft dollars, and promotions on his mind.

But dealing directly with customers means competing with very few dealers who have made the vendor's products a success at the retail level. That spells trouble.

Vendors who have alienated the dealer channel have stirred up a hornet's nest of controversy, and the weaker ones have seen the results on the bottom line. With vendors around the world trying to capture dealers' shelf space, and willing to do so at a manufacturer whose eyes have strayed toward direct corporate sales.

One approach that has worked — and may work still — is to establish a special sales force that talks directly to corporate accounts but works with the reseller

community.

Lotus Development, Ashton-Tate, and many other software companies have legions of representatives calling on corporate America and then steering buyers toward resellers.

This system works because everyone in the chain is appropriately compensated and recognized. And the buyer wins because of the direct contact it gets with the manufacturer.

To ensure high-quality service, though, those legions are going to have to work even more closely with the reseller. It won't do any good for Apple to say a particular network configuration is possible, or to suggest that an upgrade will be available without bringing the dealer into the discussions so that it can fulfill those pledges.

What good is a warm and fuzzy feeling, after all, if the dealer hasn't sufficient information to create and support the system promised?

This discussion of service and support should not be considered a commodity of only the high end — the companies with fat profit margins and high-priced systems. Customers of every type, including those that shop for stores, have certain expectations of the dealer or the telemarketing representative, and the product itself. On the phone, they hope to be treated courteously by people who know what they are selling. In the store, they hope that the salesperson will answer basic questions and demonstrate the system — even if it sells for less than \$2,000.

All of this takes time. It takes time for a vendor to meet with resellers, thoroughly train them on products, and then offer promotions. It will likely take at least as long to brief the reseller on service options, brief the corporate culture about which services are free and which are on a fee scale, and encourage multilevel sales. Vendors may even need to encourage resellers to specialize or keep specialists on staff for various market needs — accounting, desktop publishing, or networks.

So why should a dealer or vendor bother with these time-consuming tutorials? For the same reason that Nordstroms takes the time to sell a teenager a pair of \$30 shoes that fit: Customers remember and will come back — with or without a sale to lure them in. But if the reseller — telemarketer or in-store sales person — treats the customer as a commodity, the customer will feel the same way about the store.

For 1989 to truly be the year of service for the PC industry, the manufacturers and resellers will have to realize that it is in many ways a service industry. There is still enough mystery and fear surrounding PCs and their peripheral products to keep customers from selecting personal computers the way they do a toaster oven or color television.

The fact that a reseller takes care of the customer, and the time that the vendor takes with that reseller, should be considered investments that are paid back in the form of satisfied customers who return to that store and vendor.

Rachel Parker is senior editor of InfoWorld's industry section.

TECH STREET ■ BY JOHN GANTZ

Let's Celebrate Compaq's Entry Into the Two-Billion-Dollar Club



Get out that cherry bomb you brought back from South Carolina on your last trip and have been saving for a special occasion and light 'er off tonight. We're celebrating.

The occasion?

Compaq's passage of the \$2 billion mark in revenues — which happened, by the way, only one year after it passed the \$1 billion mark. And while growing that fast, the company also managed to almost double its profit margin.

Wow.

In anticipation of this event, I asked some of my compatriot researchers, mainly Geoff Wallacott, here at Tech-InfoWorld Financial Services, to do a little investigation of Compaq, the premier IBM clone company, now even bigger than Amdahl Computer, the maker of IBM plug-compatible mainframes. What's the secret to Compaq's success? Is it luck? Double agents in IBM? Texas bravado? Gold-plated financing?

Before we find out, let's remind ourselves of how successful it has been. Just look at its four-year revenue and margin history. (See chart below.)

I think the last time I looked at Compaq in this column was to congratulate the company on making it to \$500 million in a single year. I think I speculated that it might reach the \$1 billion mark sometime before 1990.

So what's behind Compaq's performance? What did our probing reveal? What are the key ingredients of this company's success? Well, some of them are:

- IBM. How nice that IBM created the DOS standard and a market big enough to support billions of dollars of sales of IBM compatibles. Even nicer that the company blew its entry into transportable and laptop computers, that it threw an operating system curve in its 80386-based product, and that it continues to offer premier pricing. Compaq has had more than a little running room, thanks to IBM.

- Real-time market understanding. Compaq goes to great lengths to keep all its top decision makers — and all other decision makers, for that matter — close to customers. Rod Canion and his lieutenants don't live in an ivory tower. They spend time each week meeting with dealers and dealer customers. The company also spends money on primary market research — and listens to its market researchers. Compaq's late — and highly successful — entry into the laptop market is an example. The company re-

peatedly shelved laptop products because its market research said the technology — principally concerning batteries — wasn't yet up to customer demands.

- Philosophy. From the beginning the company has had both a powerful product philosophy and a powerful corporate philosophy. The product philosophy has been to offer high-quality products that conform to the prevailing standards — and to do so through a single distribution channel. The corporate philosophy has been to maintain few layers of management and to make decisions more or less by consensus. The top exec-

“What's unlikely is that Compaq will make a major blunder.”

vives don't ram decisions down the throats of underlings.

- Discipline. Besides IBM, this may be the most important component of Compaq's success. It's one thing to have a philosophy, quite another to live by it. In its early days, admit company executives, it was often under a lot of pressure to move product outside its dealer channel. But the company turned business away and avoided whole markets, like the educational market, simply in order not to violate its single-channel precept. Few companies have the corporate willpower to do that. You might argue that few companies can afford to turn business away on principle and that Compaq has been well-heeled since its first rounds of venture capital — but the discipline shows up in too many other aspects of the company's life to dismiss so cavalierly.

Can the company stay on this roll?

Probably at least through 1989. Wall Street analysts, for instance, are predicting 1989 revenues of close to \$3 billion as Compaq capitalizes on confusion in the marketplace over IBM's Micro Channel Architecture. And its ahead-of-plan laptop sales should keep going.

But sooner or later the company could find itself on a muddier track. Once MCA does catch on, Compaq's main point of leverage in the 80386 market loses oomph. And all the while the company's growing at faster than 30 percent, it will have to reach outside for cash.

What's unlikely, though, is that Compaq will make a major blunder. Its whole culture is geared toward catching mistakes, while they are still small. So then maybe the key to Compaq's long-term performance rests, as it has in the short term, more on IBM than itself. If IBM were doing as much right as Compaq, then life would be a lot tougher for this amazing newcomer to the computer industry's billion-dollar club.

John Gantz is editor of the Tech Street Journal, a newsletter on the high-tech stock market and business performance. The views expressed are his own.

A Four-Year History of Compaq

Revenue (in millions)	Margin (percent)
\$2,065	12
\$1,224	7
\$625	7
\$504	5

PERSPECTIVES

OS/2

Waiting for the Killer Applications

BY ED SCANNELL

While it seems as if OS/2 has been with us long enough to warrant a mid-life kicker, the much maligned, highly praised, and certainly heavily promoted operating system has only taken its first few steps out into the marketplace.

On April 2, 1987, IBM announced not so much the birth of OS/2, but its conception. Amid a laser light show and blaring pop music in Miami (a setting more appropriate for the "Solid Gold" dancers than a major announcement from the world's largest computer company), IBM proudly spoke of OS/2 for the first time.

That day, the company touted the benefits of the new operating system, among them its capability to multitask DOS- and would-be OS/2-compatible applications simultaneously, while communicating with large host systems; and an interface that would allow developers to create applications that would all have the same appearance. In short, IBM spoke of how OS/2

would fundamentally change the way users approached microcomputing. It all sounded like a bit of microcomputing heaven here on earth.

But there was one hitch.

The program's first version wouldn't be out for eight months, with the more sophisticated versions not available for well over a year. With that news many users moved back from the edge of their chairs and adopted the classic wait-and-see position.

WATCHING AND WAITING. OS/2 may yet bring down a little bit of heaven. In fact, several Fortune 1000 firms have said they intend to make it their primary desktop operating system within the next couple of years, swearing by its rich programming environment and future applications' benefits. But despite almost two years of aggressive marketing and promotion by IBM and Microsoft Corp., many more companies are still settled comfortably in their chairs waiting to become true believers.

"The biggest weakness right now is the lack of applications," said Leslie Fiering, an assistant vice president at Bankers Trust in New York, echoing what

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her peers have said for months. "Even if there was some strong incentive to move over [from DOS], which I don't see yet, we don't have that critical mass of applications yet."

There are 200 or so applications shipping that take advantage of OS/2's multitasking capabilities and memory above the 640K barrier, according to Microsoft officials. However, the vast majority of these programs are simple ports that look much like their DOS-compatible counterparts and don't offer any innovative features. And with only one exception — Borland International's Sidekick — they're all written for Version 1.0 of OS/2, rather than for Version 1.1 with Presentation Manager.

There are other trees across the path of users accepting OS/2. Many companies don't have a large enough base of 80286 or 80386 machines equipped with the 3 and 4 megabytes of memory and EGA-quality monitors needed to run OS/2. The still sky-high cost of memory, together with the cost of other add-on hardware and new software, continues to price many small and medium-size companies out of the market.

At this point, OS/2 is practical only for power users or on a departmental server. With the large amounts of memory required to run the operating system and applications, and the skepticism of many users about its price-performance values, observers believe many will bring in the program as a server product where they can examine it at "arm's length" before bringing it onto the desktop.

"It is not the kind of thing you put on your machine and off you go," said Nancy McSharry, a software analyst at International Data Corp., a market research firm, in Framingham, Massachusetts.

gories that it just can't lay its hands on the precious few developers talented enough to do this work. The gravitas has it that the company won't deliver a version of Word for Presentation Manager until six to nine months after it delivers Word for Windows, which isn't expected out until May.

"What is telling is what Microsoft has

[not] done for OS/2 applications," said Richard Smith, president of Phar Lap Software Inc., in Cambridge. "If you are Microsoft, do you go out and compete against several major vendors in the DOS market, or do you concentrate on OS/2 and risk your DOS market?"

PUSHING DEVELOPMENT. There seems little

doubt that OS/2's ultimate success hinges not on one "killer" application, but on a variety of them spread over "all the major categories. Some industry observers fault IBM and Microsoft at this point, however, saying they're concentrating too much on the larger vendors and ignoring the smaller ones that may have some of the more interesting ideas.

"In the last major operating system shift, the existing applications leaders didn't provide applications that took advantage of the new system," said Jeff Tarter, editor of *The Soft Letter*, in Cambridge. "Yet Microsoft's strategy with OS/2 has been to focus on the established companies, which are precisely the companies that won't come up with

You Don't Need Presentation Manager to Get Windows and Multitasking

BY STUART J. JOHNSTON

Moving to OS/2 Presentation Manager is not yet a realistic or necessary option for many users, although they may be intrigued by the ease-of-use benefits of a graphical user interface or the advantages of some form of multitasking. Instead, there are several alternatives available — dictated primarily by the hardware and the types of applications run — that can meet the needs of a variety of users.

LLOW-END SOLUTIONS. Much of the current installed base of PCs are 8088/8086-based computers that lack the computing horsepower required to run Microsoft Windows, let alone OS/2. And except for "turbo" machines that run at clock speeds of 10 MHz or more (or PCs with accelerator boards installed) even most AT compatibles are not "graphics capable," which Microsoft defines as having the horsepower necessary to run Windows effectively.

Still, for users of these PC- and XT-class machines, there are options that provide the look and feel of a windowing interface using the character-based graphics in the IBM character set.

One of the newest of these is the user shell that comes with MS-DOS 4.0. The shell conforms to IBM's Common User Access (CUA) specification — meaning

"Desqview offers similar benefits to Windows/286, minus the graphical interface."

that it has a similar look and feel to Windows and Presentation Manager. Other companies also offer user shells, but many do not conform to CUA.

MS-DOS, of course, is a single-tasking operating system, so it will not be the answer for users looking for some form of multitasking. DOS users can, however, accomplish a crude form of multitasking — more appropriately called context-switching — by using a program such as Soflogic Solutions Inc.'s Software Carousel or terminate-and-stay-resident programs, which provide simple task switching. However, they take up precious user memory.

For more sophisticated multitasking, owners of 8088/8086-based computers can use products such as Desqview from Quarterdeck Office Systems, which allows them to have more than one

application loaded and running at once, even displayed in multiple partial screen windows.

"Between 10 and 20 percent of the 1,000 PC users on our network are using Desqview," said Richard Messeder, computer applications engineer for Southern California Edison. "We don't have sufficient reason to go to OS/2."

286 OPTIONS. Owners of 8086-based machines — the next largest group of installed PCs — have even more options. These computers are graphics capable and can run Windows/286, plus all the programs that will run on 8088/8086-based systems.

Windows/286 affords the benefits of a graphical user interface, as well as the capability to multitask applications. This is limited, of course, by the amount

of memory that can be multitasked. Desqview, designed for multitasking existing DOS applications, offers similar benefits to Windows/286, minus the graphical user interface.

On the high end with Windows/286 and Desqview, however, is that memory above the 1 megabyte directly addressable by the operating system must be expanded memory specification (EMS) RAM.

HIGH-END ALTERNATIVES. The smallest group of installed machines to date are based on the 80386. There is a variety of sophisticated options available that takes advantage of the virtual-mode feature of the 80386.

Alternatives include Windows/386, Desqview 386, IGC's VM/386, and Sunny Hill Software's Omniview with 386-to-the-Max, all of which offer multitasking. They can handle bigger applications in the background and take advantage of the virtual-mode feature of the 80386 chip for better data protection than on their 286 counterparts.

(For a complete analysis of 386-based multitasking environments, see our product comparison, February 13, Page 51.)

Regardless of the type of system used, users who are sitting on the fence about moving to OS/2 still have plenty of options available. □

The DOS-to-OS/2 Shuffle: Software Vendors Work on Porting Their Applications

All of the major software developers have ported their popular programs to OS/2 or have announced intentions to do so.

Aldus Corp. has announced plans to develop Pagemaker for OS/2 with the Presentation Manager. It's expected to ship during the second or third quarter.

Alpha Software has announced plans to port its Alpha/Three, Keyworks, and Keywords Advanced Edition to OS/2, Version 1.0 and then to Presentation Manager.

Ashton-Tate has announced Ashton-Tate Microsoft SQL Server, expected to ship by the end of April, and DBase IV 1.1 for OS/2, which has a ship date of 1989.

Autodesk Inc. has said it intends to move AutoCAD to OS/2 with the Presentation Manager. The product will be available sometime during 1989.

Boylan International is currently shipping Sidekick for Presentation Man-

ager and Paradox OS/2 for Standard and Extended Edition 1.0.

Computer Associates has said it intends to develop Superproject Expert for Presentation Manager. They are currently shipping Accpac Plus System Manager/2 and Superproject Expert/2 running under protected mode for Standard and Extended Edition 1.0.

Database International Inc. announced Database OS/2 and Database OS/2 EE, both for the Presentation Manager.

Digital Research Inc. has said it plans to port three products to OS/2 with Presentation Manager: GEM Desktop Publisher, GEM Draw Plus, and GEM Graph, all of which have third-quarter expected ship dates.

IBM Corp. is shipping Displaywrite 4/2 for OS/2.

Informix Software Inc. is currently shipping Informix-4GL and Informix-SQL for OS/2 Standard and Extended

Edition 1.0.

Lifetree Software has said it will develop an OS/2 version of Total Word.

Lotus Development Corp. has announced 1.2-3/G for the Presentation Manager and 1.2-3 3.0 for OS/2 Standard and Extended Edition 1.0, Lotus/DBMS for the Presentation Manager, Agenda for OS/2, and Lotus Notes, a groupware computing package, for the Presentation Manager.

Micrografx will be offering OS/2 with the Presentation Manager version of Designer, which is scheduled to ship in April. The company has also announced plans to develop Graph Plus and Draw Plus for the Presentation Manager. Both are expected to ship during the second quarter.

Microsoft is shipping Rbase for OS/2.

Microsoft Corp. has announced SQL Server for Standard and Extended Edition 1.0 and OS/2 LAN Manager for Standard Edition 1.0, and it has shown

Excel for the Presentation Manager but given no ship date for the product. Microsoft is currently shipping Multiplan for OS/2 1.0 and all its language/development tools for OS/2.

Oracle is shipping Oracle for OS/2 and has announced plans to develop Oracle tools for the Presentation Manager.

Symantec Corp. is shipping Think Tank, Version 2.41 OS/2 and an OS/2 version of Q&A.

Word Perfect Corp. has announced Word Perfect 5.0 for OS/2. The product is scheduled to ship during the first quarter. By the end of the year, the company has said it will be shipping Word Perfect 5.0 for Presentation Manager.

Zenographics has announced Pixie to run under OS/2 with the Presentation Manager. It's scheduled to ship during the second quarter.

Zsoft is shipping Publisher's Paintbrush for OS/2. □

anything new," he added.

Several users interviewed believed Microsoft would benefit from having "evangelists" similar to those used by Apple Computer Inc., who would go out and give "religion" to those developing applications.

"They [Apple's evangelists] put companies together and try to provide you with every possible resource. Microsoft is not noted for being the most helpful when you are doing critical applications," said Bankers Trust's Fiering.

Microsoft refutes this, saying it has sold over 5,000 OS/2 Software Development Kits, at \$3,000 each, to developers of every color and stripe. Included in the

"Microsoft would benefit from having 'evangelists,' similar to those used by Apple."



kit is access to Dial, Microsoft's electronic support system that allows developers to present ideas to Microsoft and get feedback on them. The company also had a large contingent on hand at the recent Macworld Expo, in San Francisco, pro-

moting OS/2 development among Macintosh developers.

"We do have a lot of contact with smaller companies, but we won't give them \$1 million to develop an idea. We have found that is just not good busi-

ness," said Adrian King, general manager of the OS/2 product group.

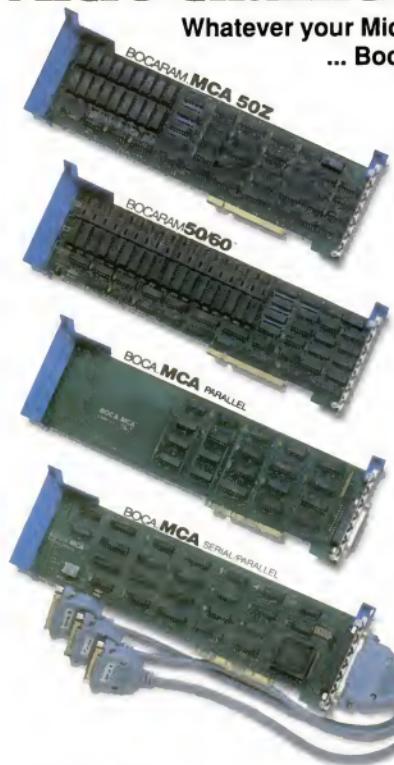
Microsoft believes the business of attracting smaller developers to OS/2 will take care of itself as these developers try to gain an advantage over competitors that continue to bank on the success of DOS-based applications.

Another factor that has slowed OS/2 software development, according to critics, is the delta between the time IBM and Microsoft delivered OS/2 Standard and Extended Editions 1.0 and the introduction of Version 1.1, with Presentation Manager.

Developers that purchased OS/2 Standard Edition 1.0 essentially bought them-

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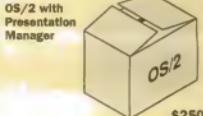
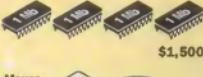
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What It's Really Going to Cost To Upgrade to OS/2

According to Microsoft Corp., OS/2 can run on a 286-based system. For optimum performance, however, a 386-based system is recommended, according to John Murphy, director of special projects and senior staff consultant for Wohl Associates.

Using a 386-based system with an EGA board and multisampling monitor, a 40-megabyte hard drive, and 1 megabyte of RAM as the base configuration, upgrading to OS/2 with the Presentation Manager would require:

4 Megabytes of RAM



EGA inserts minimum requirement to run OS/2. VGA purchaser could be defrauded.

Prices listed are "street prices"; components as supplied by Wohl Associates, which specializes in consulting for end-user computing.

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PC Magazine, Jan. 31, 1989, awarded Northgate's
286/12SM system its highly respected...

EDITOR'S
CHOICE



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EDITOR'S CHOICE
FACT FILE

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(800) 548-1993
(612) 553-0111

List Price: With 1MB RAM, 67MB hard disk, 1.2MB 5½-inch or 144MB 3½-inch floppy disk drive, monochrome card and monitor, DOS 3.3, \$1,995; with VGA card and monitor, \$2,599.

In Short: Northgate bundles high-performance systems. The competitively-priced 286/12 combines hardware and software components to get the most from the 12-MHz AF-Level architecture.

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- Hard Drive—Microscience 68MB, 28MS access time.
- Controller—16-bit, RLL, 1:1 interleave for 800,000 BPS data transfer.
- Famed OmniKey/102 keyboard—pick of the pros.
- Floppies—One 1.2MB 5½ inch; one 1.44MB 3½ inch.
- Monitor—14" flatscreen, amber or white, 1000 line resolution capability.
- Video Adapter—Hercules compatible with parallel port.
- Software—Northgate MS-DOS 4.01 with GWBasic, hardbound covers; PCKwick hard drive caching; Northgate System and DOS on-line user's guide; Northgate Utilities.

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selves a commemorative of the OS/2 development effort. Many bought the program to evaluate what the environment offered them, although relatively few created and brought compatible applications to market. Instead, they've opted to wait for the Presentation Manager to be available so they could port their DOS applications to both OS/2 and the Presentation Manager.

Some believe that if IBM and Microsoft had decided to release OS/2 and Presentation Manager together, many more vendors would have begun development earlier. Microsoft executives disagree, however. They believe that delivering the OS/2-Presentation Man-

"Despite factors within and beyond its control, Microsoft's zeal remains unshaken."

er combination in a piecemeal fashion as they did was the correct thing to do. "It would have been too much of a jump for people to make and we may have gotten [fewer applications] than we did," Mackaman said.

UNWAVERING COMMITMENT. Despite these factors within and beyond its control, Microsoft's missionary zeal remains unshaken. It believes the critical mass of 80286- and 80386-based machines will arrive, memory prices will drop as the DRAM drought eases this year, and that Windows users, growing by the scores each week, will naturally switch over.

Not everyone is as convinced as Microsoft, however, that all the pieces will neatly fall into place. Most observers agree users will throw out lots of 8088s and slower 286-based machines in favor of faster systems the next year or two. They also agree memory will once again be plentiful and prices will drop. But they don't necessarily believe Windows users — even Windows/386 users — will automatically switch over to OS/2.

Given Windows/386's fairly low price, its capability to multitask hundreds of DOS-compatible applications, and its graphical interface, many think the environment can adequately serve the majority of users' needs for years to come.

Microsoft officials, naturally, disagree. They believe that since Windows/386 users already have made the necessary investment in hardware to run OS/2 and Presentation Manager, they will switch over quickly. When they do, they see the advantages the new software brings.

Microsoft's King believes companies are switching to Windows now to prepare users for the move to OS/2. "I'm very pleased when someone buys Windows," he said. "It means I'll be able to sell them OS/2 in a couple of years."

Windows isn't the only product that could distract users from adopting OS/2. DOS extenders, which give DOS-based applications access to much more memo-

ry and protected-mode capabilities and character-based operating environments such as Quarterdeck Systems Inc.'s Desqvew, pose similar threats.

"For a lot of users could get something as simple as [Softlogic Solutions Inc.'s] Software Carousel for context switching or Desqvew for something more sophisticated. Each has its problems, but they will do the job," said Schwab's Gordon.

Microsoft says these solutions are adequate for stand-alone applications but will present major problems for anyone who wants to communicate over networks. "A lot of people will be surprised when they try networking with a DOS extender," Mackaman added. "They'll have a lot of conflicts." One last problem is IBM and Microsoft's commitment to enhancing DOS. If the two companies do a good job of upgrading the product over the next couple of years, they could be getting in their own way in terms of moving rank-and-file users over to OS/2. Some cynics think they won't be aggressive in this endeavor, realizing that royalties on OS/2 sales are about triple those of DOS.

IBM and Microsoft, for their part, think they can adequately enhance and smoothly deposition DOS over time as the low-end solution for users that do single tasks at a time, without siphoning momentum from OS/2.

QUESTIONS REMAIN. Arguing back and forth over the relative merits of OS/2-Presentation Manager and various DOS alternatives can only be as fruitful as the conversation between the two protagonists in *Waiting for Godot*. After almost two years, developers and users alike are aching for the moment to arrive when they can make their own side-by-side comparisons between built-from-the-ground-up OS/2 applications and their existing DOS applications.

As one Microsoft vice president, who wished to remain anonymous, put it: "I just wish they would get these things out the door so we can all start talking about something else."

Amen.

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TO THE EDITOR

Systems Integration Urged

I enjoy David Buerg's "Connections" column and find him to be one of the few computer journalists who is not predisposed to the MIS person's point of view. He regularly comments on the merits of non-LAN computer networking, for instance, and acknowledges the usefulness of PBXs as vehicles for networking.

People in both the computer and telecommunications industries are beginning to understand the solutions that the other has to offer, and are starting to get past the cultural differences between those industries. Since the information business is historically technology-driven, it is interesting to note that business customers, not just a vendor's engineers, are the ones who tell "voice" systems vendors to understand "data" and vice versa. In fact, this cross-industry knowledge is now a precondition to good customer service.

All network vendors claim to have the networking standard, but nobody really does. It is a real dilemma for customers to bring information to those who need it. If a phone system works for networking, then why not use it? Today, many companies are merging the MIS and telecommunications functions into one body of authority. If companies can save real dollars by interconnecting PC LANs with their phone systems, and resolve LAN distance restrictions in the process, then they should use it. I would venture to say that PBX is the least understood computer networking resource today.

Although IBM and ROLM couldn't make their marriage last, other companies have come to recognize the need for voice and data systems integration. Extensive systems integration capabilities are represented by Northern Telecom's Macintosh, MS-DOS PCs, and LAN connection solutions via PBX and phone company central offices. Farallon's Phonenet and screen-sharing software and CO LAN facilities offered by telephone companies represent other integration opportunities.

So PBX manufacturers make LAN equipment designed for PCs and computer vendors buy into PBX companies. When voice and data systems vendors together deliver a workstation that uses the breadth of functionality offered by LANs and telephone networks, then customers will realize unexpected savings from more efficient networking and telephone usage.

This workstation might be based upon existing PC platforms, requiring only a simple interface to phone systems. Can it work in real time? Then why not add E-Mail and voice mail to the same workstation? Now the concepts of Knowledge Navigator and collaborative computing take on new meaning.

The true systems integrators today need not only understand a computing and LAN environment, but must also consider PBXs, wide area networks, ISDNs, the RBOCs, new technologies, and the cultures of several technologies. Then, they'll be ready for the future.

Stephen Hawley
San Ramon, CA

RESOURCES

February 28-March 2, San Francisco: Uniforum 1989 includes tutorials, marketing panel discussions, and technical presentations on the Unix operating system. The show will also feature more than 200 exhibitors of Unix hardware, software, and services. Location: Moscone Center. For further information, contact Pemco News Bureau, 2400 E Devon Ave., Suite 205, Des Plaines, IL 60018; (800) 323-5155, (312) 299-3131 in IL.

February 28-March 2, Boston: Network '89 provides access to hundreds of networking products for hands-on demonstrations. It also includes a series of seminars. The keynote speaker is James Bruce, vice president of information systems at the Massachusetts Institute of Technology. Location: Hyatt Regency Embarcadero. Contact: Hyatt Regency Embarcadero, 6229 Wildlife Road, Malibu, CA 90265; (213) 457-5850.

March 6-9, Washington: Federal Office Systems Expo (FOSE) '89 offers 50 conference sessions that will cover topics such as multivendor integration, database servers, and operating environments. Compaq's Rod Canion will deliver the keynote address, "The Future of PCs: The 80386 and Industry Standard Architecture." Location: Washington Convention Center. Contact FOSE '89, 2111 Eisenhower Ave., Suite 400, Alexandria, VA 22314-9971; (800) 638-8510, (703) 683-8500 in Washington.

March 13-16, New York: Interface '89 Plus is an exposition and conference focusing on new computers and communications products and services that process, store, and transmit information

in the forms of data, voice, and images. Internet, a fiber-optic network that permits exhibitors to conduct live networking demonstrations, will be featured on the show floor. Location: Jacob Javits Convention Center. Contact: Cheryl Delgroce, Public Relations, The Interface Group, 300 First Ave., Needham, MA 02194; (617) 449-6600.

March 13-17, San Francisco: The ninth annual Seybold Seminars conference focuses on technical and managerial issues of importance to professional publishers in newspaper, magazine, commercial, and in-plant applications. The price is \$1,250 for the entire week. Two separate seminars are available. Location: Hyatt Regency Embarcadero. Contact: Seybold Seminars, 6229 Wildlife Road, Malibu, CA 90265; (213) 457-5850.

March 15, New York: The Data Processing Management Association presents the second annual Computer Virus Clinic. Topics will include discussion of virus prevention, detection, and recovery. Registration: \$225. Location: World Trade Center. Call (800) 835-2246, ext. 190.

March 16-17, Boston: Gen2 Ventures presents a seminar focusing on IBM's Systems Application Architecture (SAA). The seminar covers topics such as common user access, common programming interface, and common communication support. The registration price is \$795, but group discounts are available. Contact: Kim Campbell, Gen2 Ventures, 12930 Saratoga Ave., Suite D-5, Saratoga, CA 95070; (408) 446-2277.

April 2-5, Nashville, TN: The seventh

One Vote for Small Over Big

I am in full agreement with the letter from Dan Ehrmann of Kalista concerning the on-time delivery of *InfoWorld*'s Paradox 3.0 (February 6, Page 46).

Another database management system had an on-time delivery, *Database 4.0*, and it reflected a long list of user-requested enhancements.

Could it be that Ashton-Tates and Lotus have beaten the General Motors of the technology world while the smaller, not as entrenched (read saturated) companies are really the true innovators? As a DBMS user from the beginning, I am glad that my company has selected a product like *Database* with which to work and grow.

Advertising budgets and expensive public relations firms may provide the best exposure, and sometimes the worst, but I'd rather deal with a company that puts the users ahead of the noise and takes the time to deliver on its promises — without litigation.

Robert H. Walters
President
Phoenix Solutions
San Francisco

Please write to Letters, *InfoWorld*, 1060 Marsh Road, Suite C-200, Menlo Park, CA 94025 (MCN Mail: 259-4127; CompuServe: 73267.1537; or The Source: TCX939). Include your name, address, and daytime telephone number. Letters selected for publication will be edited for length and clarity.

annual Computer-Based Training Conference will include nine workshops and over 50 sessions. The hall will be open April 2-4. Location: Opryland Hotel. Contact: Martha Irvin, Weingarten Publications Inc., 38 Chauncy St., Boston, MA 02111; (617) 542-0146.

April 10-13, Chicago: Comdex/Spring '89 will feature more than 1,000 exhibitors and 50 conference sessions. Macdex/Spring '89, a new trade show dedicated to the Macintosh distribution channel, will take place on the same dates. Location: McCormick Place. For further information, contact Cheryl Delgroce, Public Relations, The Interface Group, 300 First Ave., Needham, MA 02194; (617) 449-6600.

April 17-20, Philadelphia: The 10th annual National Computer Graphics Association (NCGA) Conference and Exposition will feature 225 exhibitors and offer 133 conference sessions. The show features NCGA's Integrate '89, which is a systems integration demonstration showing how computer graphics standards can be applied to increase productivity. Location: Philadelphia Civic Center. For registration information, call (800) 225-NCGA.

InfoWorld welcomes notices of national conferences, trade shows, and meeting schedules of professional data processing, MIS, information center, and microcomputer management associations or support groups. Send notices to Resources, *InfoWorld*, 1060 Marsh Road, Suite C-200, Menlo Park, CA 94025. No local training or education seminars, please.





RIDING THE FOURTH WAVE ■ BY JEFF ANGUS

1Dir Plus: A Powerful Erector Set for Building DOS Shells

I love L.A. But because it was built on a *fantastic dream*, not an *organized concept*, every growth change is hideously wrenching, requiring the demolition of serviceable buildings, the filling in of irreparable tar pits, the complete reworking of traffic patterns.

Programs tend to be the same. Ever

owned a spreadsheet that on upgrading from Version 1 to 2 required you to change the file format? Or a word processor that changed command keys from version to version? This results from a couple of factors — bad planning or bad planning. The designers didn't think through the program for later expansion, or they made something clumsy and later had the guts to change it (but at the cost of lost productivity to old users).

Show me a program that's been growing and evolving for over five years without any of these unsightly demolitions and I'll show you a well-planned, structured work. Bourbaki's 1Dir Plus (a.k.a. Wonder Plus) is a precise example of thoroughly well-thought-out software.

The original program, considered the first "DOS shell," was developed by Greg Harley and Chris Severud for Bourbaki Inc. of Boise, Idaho, in 1983. Since then,

it's grown about tenfold without resorting to ugly demolitions, coherently maintaining the same clear concept it started with.

That concept, which has the same validity in today's Version 3.0 as it had in 1983, was to provide a panoply of related tools for customizing the sparse, view-less way DOS cemented people's PC work together. And while DOS' vendors have given it a real face (MS-Windows) and a couple of face-lifts since (Windows 2.0, and Windows 3.0 a la Presentation Manager), 1Dir Plus has always provided ways to build a myriad of faces.

A DOS shell puts a strong point of view on the view-less DOS; that view may or may not serve any specific user. Although 1Dir Plus can work as a formed DOS shell if you ignore 85 percent of what it does, it isn't one; it's an erector set for building shells for end-users or for power users to build for themselves.

1Dir Plus uses a couple of Bourbaki's principles: faces and personalities. Faces are DOS shell screen designs, and the package comes with nine pre-canned ones you can flip between with a key combo. Personalities are choices of files to display and the order in which you sort and display them. Exceptionally, you can customize the personality of each sub-directory, choosing different Xywrite document formats, sorted by date in that subdirectory but showing all files sorted by size in your Tornado Notes directory.

This maintenance of differing personalities of varying tasks supports a key Fourth Wave ethos: Good implementation takes advantage of the strengths of each user and each program while trying to work around the weaknesses of both.

As if all the inherent customizability of 1Dir Plus wasn't enough, Bourbaki has a product for serious systems integrators and VARs: Muscle. Muscle is a programming language for further customizing 1Dir Plus, and even for customizing the ways in which it can be customized. The extensible (of course, recursive customizing) language includes control structures, parameter passing, the capability to run a program by calling a file created by it, and a full range of security enhancements.

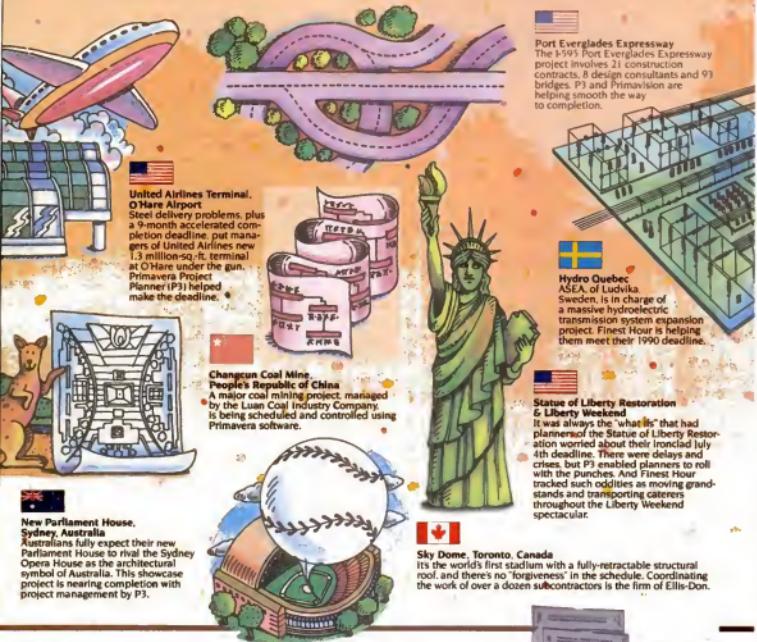
On the bad side, 1Dir Plus isn't as easy to use as one might like, especially for experienced micro users. Because it pre-dates the common interfaces that most software tries to imitate (1-2-3 or Microsoft menu), it doesn't reflect them so much as it does the Bourbaki guys' concept. While it's a fairly small task to build any view for end-users, the developer using this erector set may blow some mental fuses in customizing the first couple of shells.

Far outweighing the bad side is a stunning set of positives: customization and personalization built on more customization. 1Dir Plus in the hands of savvy implementors makes possible the kind of workplace productivity frequently talked about but rarely implemented — the ethos that each user's system can be molded to help achieve optimal performance. Info center staff who ignore this concept will watch their companies slip behind the competition, a fatal piece of bad planning.

Just like L.A., the day they demolished the Olympic Drive-In theater.

Jeff Angus was a systems analyst and technical support specialist for a consulting firm. Comments are welcome. MCI Mail: **jangus**.

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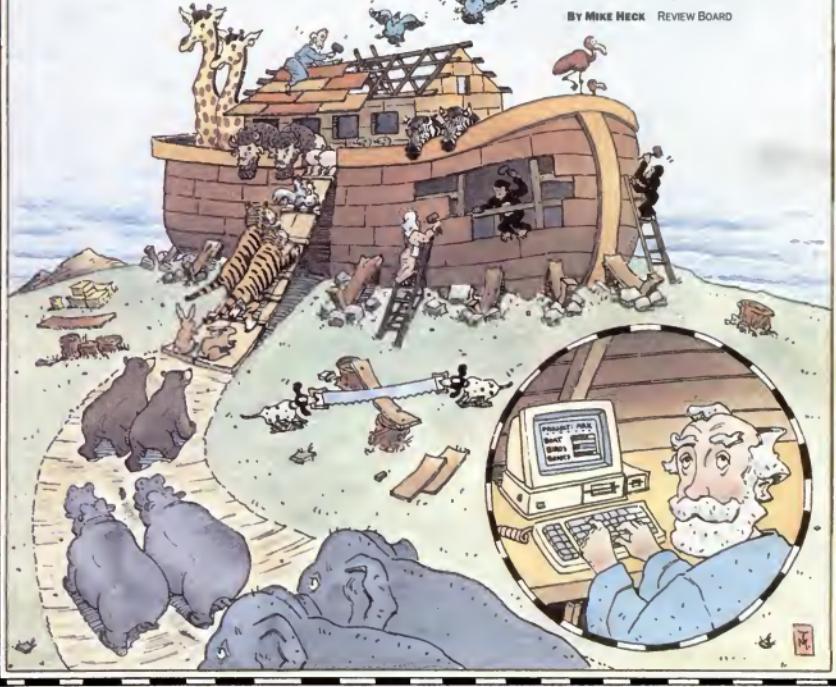
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PRODUCT COMPARISON

For That Really Big Project...

Seven high-end project management packages that can handle a flood of work — whether for an Ark or a Space Shuttle.

BY MIKE HECK REVIEW BOARD



Automated project modeling — born of the need to track massive defense projects such as the Polaris submarine — used to demand the power of a behemoth mainframe or networked minicomputers, and a dedicated programming staff.

Now, as desktop systems continually compact computer power, project management software keeps pace with more efficient database designs, higher-resolution graphics, and simpler interfaces. To appreciate these engineering advances, consider that projects on the scale of the Statue of Liberty reconstruction, the Olympics, and NASA's space station

plane are routinely handled by micro-based project management systems.

Naturally, not everyone requires this power because there aren't that many projects of such magnitude. Infrequent users and executives find that easier-to-use programs (such as Timeline, Harvard Project Manager, Super Project, and Instaplan) match their needs for monitoring

moderate-size projects.

HIGH-CAPACITY REQUIREMENTS. Professional planners' requirements, however, go beyond the capabilities and features available in lower-cost programs. The seven top-tier packages we examined, for example, can handle from 5,000 to as many as 30,000 tasks. Additionally, they incorpo-

rate expanded work breakdown coding and expense reporting that government contractors typically require. These programs also share other characteristics that make them well-suited for managing complex jobs, and they expect you to intimately understand project management techniques.

ADDRESSING USABILITY CONCERNs. The interfaces of these powerhouse packages are often involved and difficult to master. In spite of efforts to add convenient menus, several programs — Artemis in particular — haven't completed their metamorphosis from the minicomputer or mainframe world to the PC world; multiple steps are necessary to enter even the most basic information.

Products Reviewed

Artemis Project 2.1.5.....	54
Open Plan 3.1.....	57
Perfmaster Advance 2.1.....	58
Primavera Project Manager 3.1.....	58
Project Workbench 3.0.....	59
Qwiknet Professional 1.3.....	61
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One creative approach to usability involves alliances between companies with feature-rich programs and those incorporating easier data entry or better graphics. Primavera Systems teamed with Microsoft Corp., providing interchange between Microsoft Project and Primavera Project Planner. And Symantec's Timeline 3.0 transfers information into Artemis' micro and mainframe versions.

Strategic Software heads in another direction, with Promis (not reviewed here), offering a graphic interface option using Microsoft Windows. Project Workbench leverages its simple design with a direct link to Index Technology's Excelsior Case product.

ENTERPRISEWIDE NETWORKING. Virtually all developers acknowledge the limitations of stand-alone MS-DOS systems. Workgroup capabilities are significant because several departments typically interact on a large project — operations staff, financial personnel, and general management. What's more, resources from across an enterprise sometimes need to be scheduled.

Project Workbench includes local area network support. Qwiknet responds with a streamlined interface that is the same on versions for the DEC VAX and MS-DOS LANS. Likewise, Artemis and Primavera Project Planner have close ties to their more powerful DEC minicomputer

counterparts.

RELATIONAL DATABASES ADD FLEXIBILITY. Since large projects involve detailed data structures, many packages are built upon either a commercial or proprietary relational database. Open Plan uses Dbase III, for example, and Artemis provides its own development system.

You should be aware of this data-based structure if projects could use customized input screens, reports, or routines to export data into a specialized accounting system, for instance.

HIGH COSTS. The price exacted for extra scheduling flexibility and capabilities is not just more labor to establish and update a schedule. It's also reflected in software and hardware costs: At \$2,000 and up, these are some of the most expensive PC software available.

One reason for the weighty price tags is development costs that must be spread across a relatively limited market. A more important factor, however, is the expertise and support you're paying for. Project management software developers generally have extensive construction or government contracting backgrounds. As a result, programs are likely to be well-suited to large scheduling needs.

User support programs are also more developed at the high end and contribute to product cost. Often, training classes and consulting services are supplied by the vendor. And don't forget the cost of a fast 80286- or 80386-based PC with a high-capacity hard disk — scheduling algorithms can consume large blocks of processing time. You'll also need 3 to 10 megabytes free for each program; one project's data can consume another 5 to 10 megabytes.

Finally, most built-in or optional graphic modules are designed for plotter output. Dot-matrix and laser printing either are not supported or are of poor quality. However, laser printer utilities are now available that allow your printer to plot (such as Laserplot and Print-a-Plot on a laser printer).

Artemis Project

VERSION 2.1.5

One clue to this powerful project manager's potential is that Metier Corp., the vendor, is a division of Lockheed. So it's no surprise Artemis offers the largest capacity — 64,000 tasks — required for defense and space projects.

The open design of Artemis permits data to be highly customized. But while Artemis has its advantages, close examination reveals a peculiar set of pros and cons. Furthermore, Artemis' slow opera-



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PRODUCT SUMMARY

Artemis Project

VERSION 2.1.5

Company: Metier Management Systems Inc., 2900 N. Loop W., Suite 1300, Houston, TX 77092; (800) 777-7100. **List Price:** \$3,500.

Requires: IBM PC or compatible; 480K of RAM; DOS 2.0 or later, DOS 3.0 recommended; hard disk.

Pros: Large capacity, simple reporting, multiproject resource leveling.

Cons: Slow, difficult operation; no resource calendars; unorganized documentation.

Summary: Artemis Project offers the largest capacity but the most difficult interface of the high-end project management software packages.

How We Tested and Scored Project Management Software

Our product comparison of high-end project management software establishes new criteria and ratings for 1989, based on reader surveys and experience with already established testing and scoring methodology in this area. Speed tests were performed in the InfoWorld Test Center on an 8-MHz Compaq Deskpro 286 with a 40-megabyte (type 17) hard disk and a Compaq Enhanced Graphics board.

Performance:

Features and flexibility: Major areas we tested included task capacity; the capability to assign different calendars to tasks and resources, as well as variable work hours and resource loading; types of relationships between activities; and report options such as cash-flow listings, cost/budget reporting, and earned-value analysis. We established minimum standards for these applications based on common project management needs. Bonus points were added to or subtracted from the score depending on how the package's features met the basic requirements.

A 2,000-task capacity was considered necessary, placing these programs above the lower-end offerings. Multiple calendars are important — both for resources and activities — to provide scheduling flexibility. All packages in this comparison provide activity-on-node sequencing of activities. Several programs we tested also provide the simpler activity-on-arrow diagramming technique.

How tasks are connected also adds versatility; start-to-start logic is mandatory. We then looked for lead and lag time as well as other logic such as finish-to-start logic.

Additional features we considered necessary include at least one baseline schedule that can be locked. Both schedule and budget deviations are then reported against this plan. The type and precision of schedule calculations is equally important. Float time, start and

finish dates, plus estimated time and budget to completion are required.

Schedule calculations: We set up an 84-task project in a generic file format, and then each vendor entered the file into his own project management package. This ensured accuracy in setting up a reasonably complex project. The assembled project was then shipped back to us, and we tested for speed in scheduling multiple-task relationships, subprojects (when they were supported), and several resources per task. Tests were performed with and without resource leveling. Speeds were then compared with one another and scored accordingly.

Output: This final performance test involved printed or plotted output. We used each package's built-in graphic reporting capability or, if available, an add-on graphic module. We compared plotted output whenever possible, looking for how clearly information was presented on Pert logic diagrams, Gantt charts, and histograms.

Documentation:

Scores reflect the quantity and quality of both written and on-line information. At a minimum, documentation should describe the product and how to use it. Bonus points are awarded for a quick-start guide, on-line tutorial and help programs, a quick-reference card, and a written tutorial. Poor organization, missing information, or an incomplete index lowers the score. Error messages are also considered under the documentation category. Bonuses are awarded for programs whose error messages clearly explain the problem or, ideally, that offer suggestions on how to resolve the problem.

Ease of Learning:

Scores for ease of learning depend on the user interface and the intuitive design of the products. Other factors

include the complexity of the program and the quality of documentation and tutorials. To earn a satisfactory score, a program must be learnable by novices.

Ease of Use:

Like ease of learning, ease of use is in large part a function of the program's design and evaluates how easy the average user would find the program to use once the basics have been mastered. A menu system that is easy to follow and command shortcuts are two features that can simplify using a program.

Error Handling:

To earn a satisfactory score in error handling, a program must prompt you to save files and shouldn't do anything to corrupt data or make it easy for you to lose information. Packages that offer basic error messages get a satisfactory score. Bonuses are awarded for programs whose error messages clearly explain the problem or suggest ways to resolve the problem.

Support:

Support is divided into two areas: support policies and technical support.

For support policies, we begin with a satisfactory score and award bonuses for warranties, money-back guarantees, a toll-free line, and corporate extended support. We subtract points when vendors provide no technical support or limit the support to 30 or 90 days.

Technical support scores are based on the quality of service we actually received in the course of multiple anonymous calls to the vendor and the availability of knowledgeable technicians.

Value:

Scores reflect the price vs. the performance and features of each package tested, taking into account the competition.

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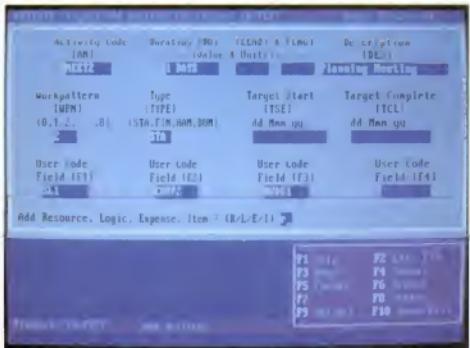
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Artemis' interface contains a large number of data-entry and selection windows.

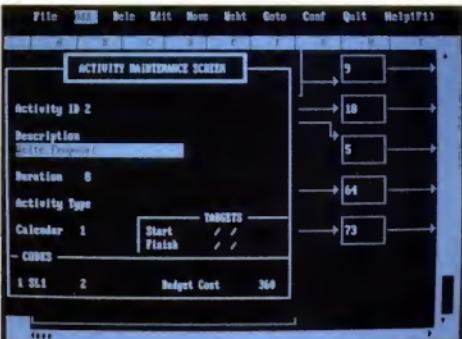
tion and very complex interface ultimately make it unacceptable for many jobs. It's still useful for subcontractors, sending information into a system's large database, for example, or transferring information into the mainframe or minicomputer version of the program.

While only 255 resources per project (and 255 per task) are allowed, and the product won't recognize subprojects, Artemis controls other scheduling aspects well. Task durations can be measured in hourly increments; activities can span non-work days, you can perform resource leveling over multiple projects, and mass updates of database information are possible. There is a very complete earned-value analysis capability.

Given its limitations in flexibility, Artemis is much more than average in features at the high-end. We rate it very good in this category.

Artemis' performance is affected by two factors: the way your database is established and processor speed. If you're planning projects of 2,000 or more tasks, a dedicated hard disk partition is recommended, which typically holds up to eight projects of this size. Since 2,000 tasks typically eat up 4½ megabytes. As a result, even with a dedicated database and bus-based computer, there's still a significant delay of 15 to 20 seconds just moving from menu to menu.

Calculation speeds were acceptable. Calculating our schedule without leveling



The Activity Maintenance screen is the heart of project setup and design in Open Plan.

required 20 seconds. You perform time-limited or resource-limited leveling by specifying the order in which resources are allocated to tasks and the resources or activities you want leveled. Recalculation speeds with leveling required one minute and 46 seconds, and speed earns a good score overall.

Artemis provides a detailed status report after scheduling or leveling; it indicates errors or, in the case of leveling, activities that are delayed. Graphics are above average, featuring a resource pie chart and on-screen display. Bar charts can include special symbols to represent milestones. There's no time-scaled Pert chart. There is plenty of printer/plotter support. Overall, we rate output quality good.

Artemis Project's five manuals are a measure of the experience required to effectively use the program. The setup and user guides take a straightforward step-by-step path through a sample project. Then there's a big jump to the *Menu Reference*, *Editor Reference*, and *Report Guide*. To digest them, a thorough understanding of project management is

required, and steps are sometimes assumed instead of described. Another difficulty is locating proper information; using the editor, for example, is an alternative way to enter project information (as opposed to using the menu), but it's not mentioned in the menu book.

Although the manuals are attractively presented, information is often hard to understand and locate. As a result, we can rate documentation no higher than satisfactory.

Artemis is difficult to set up for two reasons: separate hard disk partitions and unwieldy database utilities. Learning the program requires knowing six pull-down menus. Normally that should be a snap, but in this case there are so many options, submenus, and pop-up windows that even experienced users easily become confused. The on-line help is too brief to be of any real benefit. What's more, no lists of resources or activities are available for reference as you're building a network. We therefore rate Artemis' ease of learning poor.

Using Artemis Project is no joy, either. Because of the incredible number of data

Project Management Software Survey

In our survey of *InfoWorld* readers involved with project management software, the average number of tasks in a typical small project was 81; in a medium-size project it was 417; and in a large project it was 1,198. Fifty percent of readers believe a PC project management package should be capable of handling 500 to 1,000 tasks, and 28 percent believe it should handle more than 1,000.

Similarly, readers indicated that the average number of resources in a typical small project was 14; in a medium-size project it was 47; and in a large project it was 165. Thirty-eight percent said a project management package should handle 50 to 100 resources, and 29 percent believe it should be capable of handling more than 100 resources.

Fifty-eight percent of readers typically modify their project schedule once a week, and 19 percent modify it daily.

We asked readers how important it is, on a scale from 1 to 10, for their project management package to perform or provide a variety of features and functions. The following results represent the mean (average) response, with 1 being least and 10 being most important.

6.2 — Mixed-size modes in a single project, such as days and hours, hours and minutes, or weeks and days.

6.2 — Nested projects: the capability to incorporate subprojects into higher levels.

6.6 — The capability to retain sub-

project detail at the top level, rather than summary information.

7.6 — Manual override for resource leveling and schedule calculations.

6.9 — Cross-project resource leveling.

7.2 — Job-specific resource leveling (i.e., for tasks that require specific skills, specialized personnel, or resources in very limited supply).

7.6 — Editing a Pert chart after it has been created (e.g., copying and repositioning tasks, and adding or deleting tasks).

7.3 — Taking a snapshot of the schedule at any point for comparison to a baseline schedule or proposed changes.

6.8 — Displaying scaled-down version of Pert charts, so as to provide a top-down view of an entire chart (e.g., with a zoom function).

7.6 — Printing user-selected portions of charts or task lists.

7.7 — User-definable report formats specifically, formats that let the user determine the order of the data displayed.

7.8 — User-definable report formats specifically, formats that let the user determine which data are displayed (e.g., using filters to select WBS codes, accounting groups, etc.).

7.2 — Simple project creation, such as drawing and connecting tasks on an interactive Pert chart.

7.5 — An online mode that lets you start with major milestones and expand each level by adding individual tasks.

Importance of Project Management Features

In our survey, readers were asked whether the following items were not very important, somewhat important, very important, or required. The numbers below represent the combined percentage of readers who indicated the item was very important or required.

System Features

Mouse support.....	33
Laser printer support.....	61
Plotter support.....	40
LAN support.....	33
On-line help.....	64
On-screen graphics.....	70

Data-Entry Method

Pert/CPM chart.....	55
Gantt chart.....	66
Task loading.....	59
Work breakdown structure (WBS).....	64
File import.....	50

Scheduling Features

"Hemmock".....	31
A number of activities can be linked to a task	71

Early/late start.....	58
Early/late finish.....	61
Lead time.....	61
Lag time.....	60
Pert/CPM.....	81
Gantt.....	80
Task summary.....	85
Resource summary.....	77
Actual vs. planned schedules.....	82
Actual vs. planned costs.....	71
Running list of finished tasks.....	70
Running list of costs.....	63
Earned-value analysis.....	36

Data Import/Export Formats

ASCII.....	74
DBF.....	33
WKS.....	47

Program Features

Fixed-period resource leveling.....	53
Cross-project resource leveling.....	54
Acceptance of real-life (limited)	
Fixed resources.....	67
Variable resources.....	50
Individual calendars.....	56
Manual intervention during leveling.....	61

entry and selection windows, even simple tasks like editing existing tasks or creating a calendar can consume 50 or more keystrokes.

Defining a project is marginally easier with the Network Editor. You place up to 255 activities on a worksheet and draw connecting links. Larger projects still require going through the standard menu options.

Reports, by contrast, are quite easy to run or create. From a standard list you select the sort order and range of data to include. The report writer is equally simple: It allows you to pick fields from a list while also showing you a sample layout.

The overall difficult and sluggish operation (switching between menus, for example) is slightly offset by the streamlined reporting process. As a result, we rate ease of use satisfactory.

One benefit of Artemis' special database format is it automatically performs error checking when you're about to exceed a pre-established size. The system also notifies you of loop or logic errors. We did, however, have some trouble recovering a database that was not exited properly. Overall, error handling operated nicely; we rate error handling good.

The vendor provides toll-free telephone support for 90 days, and an update subscription service costs \$500 per year. There is also a newsletter and BBS support. We rate Artemis' support policies good.

The support staff was accessible and helped us through the corrupted database problem. They were knowledgeable and willing to take extra time to get the problem resolved. Technical support is rated very good.

Artemis' graphics are good, and renders simple to generate. It also provides the most complete earned-value analysis. But at \$3,500, and considering the extra learning time, higher cost, and operating effort, it's no more than a satisfactory value.

Open Plan

VERSION 3.1

Open Plan is the most versatile program we tested in this comparison. Used with the Dbase III Plus (or Dbase IV or Foxbase Plus, Version 2.1) database program (purchased separately), you can customize screen forms and reports or generate new ones, and design macros. If you have some Dbase experience, Open Plan files are accessible for transfer into mainframe or into other PC applications.

PRODUCT SUMMARY

Open Plan

VERSION 3.1

Company: Welcom Software Technology, 15995 North Barkers Landing, Suite 275, Houston, TX 77079; (713) 558-0514.

List Price: \$4,200; **Open:** \$2,200.

Requires: IBM PC or compatible; 480K of RAM, 640K recommended; DOS 2.0 or later, DOS 3.0 recommended; hard disk.

Pros: Variable resource capacity; can customize, time-limited or resource-limited leveling; macros.

Cons: Difficult to use reports and calendar; poor graphics; expensive.

Summary: Open database provides access to files and screens for customization and interface to other software and computers.

You work with up to 10,000 tasks per project and 256 calendars; subprojects aren't supported. An unlimited resource pool is available but only 500 resources are leveled per project. Leveling can occur over multiple projects, and resource availability can vary during the project.

You can also establish typical and maximum resource amounts; micro scheduling creates plans down to the minute; and the optional Opera module (\$2,200, half the price of the main program) provides true probability analysis for more realistic scheduling. We rate features and flexibility good.

Open Plan's time analysis is run

manually after activities are changed or added. It's a simple procedure to calculate a new schedule: Enter the date of the update and, in our test, 42 seconds later a new schedule is presented.

Like most of these packages, resources affect the schedule according to how long they can work or how many of them are available. We performed resource leveling across the entire project, requiring one minute and 10 seconds. Open Plan's speed earns a good score.

By using Dbase III, Open Plan proves exceptionally versatile in report generation. Ten sort levels are provided, and you can summarize facts about groups of activity codes for management reports

such as earned-value analysis. Open Plan produces time-scaled logic drawings, histograms, and Gantt charts. While plotters are supported, the overall quality is lacking — as is important information on the plot. As this is one of the very few output limitations, we rate output very good.

Open Plan contains separate user and reference guides. For general operations, the user manual is the place to look. It provides a guided tour and basic descriptions of all commands. The reference guide delves into advanced topics such as the report writer and system management. Many topics reference other chapters, which means you must do a lot of

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Stay in Control. Project Workbench software makes updating project status a breeze. Advanced tracking features include resource-oriented time capture by period, tracking against a baseline, estimate-to-complete rescheduling and an electronic timesheet.



Feel the power. The system offers autoscheduling, import/export, multiproject/subproject capabilities and the most extensive LAN support available. Enhanced reporting features include on-screen preview, built-in text editor and presentation-quality graphics. Plus, a major new CASE interface has just been announced.

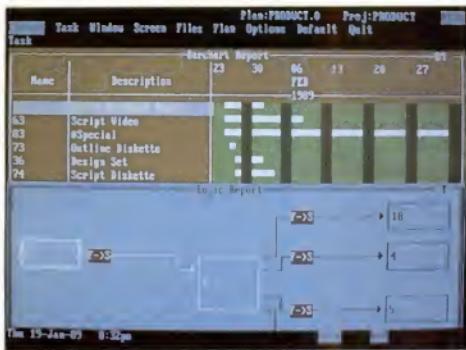
Learn fast and easily. The screens have been redesigned, menus expanded and entry forms simplified. A powerful new Help system is context-sensitive. And the expanded manual with new tutorials and reference section makes learning effortless.

Put Project Workbench Release 3.0 on your critical path to successful planning.

Call 212-219-8945 or your local dealer now and ask for your FREE 30-minute Guided Tour Diskette.



Applied Business Technology Corporation



Pertmaster Advance allows simultaneous display of various features.

page hopping. A sample project is included, but there is no on-line tutorial. We rate documentation good.

Setting up Open Plan to smoothly mesh with Dbase is basically simple. All you do is create a DOS Path statement so Open Plan knows where Dbase — or Foxbase+ (a Dbase-compatible program) — resides. Open Plan works from a series of full-screen menus, function key assignments, and letter keys, so you need to stay alert.

A project takes shape from an Activity Maintenance screen. In one spot you enter data like duration and calendar information, assign resources, and link the current activity to predecessors. Windows help eliminate having to search through printed reports for resource names for example.

While Open Plan contains multiple menus, functions are logically grouped. With on-line help to fall back on, Open Plan is easier than other programs to learn, and we therefore rate it ease of learning good.

After entering basic task information, you can add logic or enter activities through a spreadsheet-style worksheet (Project Worksheet). However, you must run separate utilities to reindex files and to perform other Dbase maintenance jobs; for the experienced Dbase programmer, access to Open Plan's capabilities can be difficult. The graphics are crude and only information about one task at a time is displayed. But you have the benefit of interactively moving tasks and editing information. Overall, we rate ease of use good.

Open Plan traps most errors and alerts you to problems (such as logic loops), and you can abandon a procedure before it is complete. We rate Open Plan's error handling good.

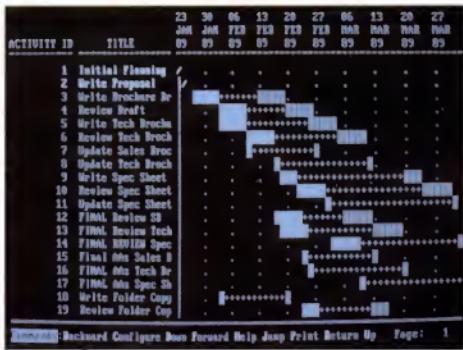
The vendor provides one year of free telephone support (not toll free) in addition to providing program upgrades, a newsletter, and bulletin board service. After the first year, the support plan costs \$840 per year. We rate support policies good.

The technical staff had a very thorough understanding of the program and Dbase and offered us some Dbase utilities to help in customizing the system. Technical support is very good.

Open Plan's open design and flexible reporting make it well-suited for interfacing with other systems. Its strength outweighs its limitations, and in spite of its \$4,200 price tag, more expensive than most, it is a good value.

PRODUCT: PRODUCT 0

Proj: PRODUCT



Primavera smooths out resource use according to available float time.

Pertmaster Advance

VERSION 2.1

Pertmaster Advance is a project management rarity, suited for both occasional and power users. The program's visual interface employs windows for simultaneous views of a project's time line, resource histogram, calendar, data entry forms, and various reports. The number of tasks, calendars, resources, subproject levels, and activity links are limited by available memory, so there are defined constraints to a project's size. In most cases, this is a few thousand tasks, the OS/2 version, though, is expanded to RAM access, can handle up to 32,000 tasks.

Pertmaster project sizes and resources are somewhat limited, and the product is really a more midrange package. While it has many advantages over lower-end project managers, it is not as sophisticated as others we reviewed. But it is less expensive than most high-level packages.

You assign a unique calendar to each activity and resource. The time scale can vary from years to days and even subday time units, useful for scheduling overtime work. Also important, Pertmaster works with hierarchical resources. For example, you might create a main resource, like a construction crew, which is made up of a foreman, five general laborers, and so on. Whenever the main resource is scheduled, its corresponding subresources are automatically allocated. While there are plenty of features available, the competitors in the high end generally offer much more (such as handling much larger project sizes). Pertmaster Advance fea-

tures and flexibility are rated satisfactory.

Automatic scheduling doesn't put much burden on the computer; scheduling time was accomplished in nine seconds. Before leveling resources, you can enter up to six of 27 different fields (including WBS codes); the affected activities have resources allocated to them before other tasks. Pertmaster Advance performs both time- and resource-limited leveling, but it's determined by whether you've entered a specific finish date. Resource leveling speed, which took a short 37 seconds, and the fast basic scheduling result in a very good score for scheduling speed.

You generate Gantt and Pert reports on plotters or dot-matrix printers. Color dot-matrix printing is available, an unusual added benefit. Output quality is good.

Neither the separate tutorial nor the reference manual contains installation instructions, which are on a typewritten sheet or in a "read me" file. They're wrong, to boot (no pun intended). The tutorial covers basic points using a sample project and is very beginner-friendly, yet the reference contains little more than a brief synopsis of each command. Error messages are complete and informative. Documentation is satisfactory.

Spreadsheet users will feel at home with the Pertmaster Advance menu structure. Pressing the slash key displays a two-line menu that lists and details, in plain language, all available options. Most important, there are only a few menu layers to navigate through.

Once you've made a selection, the program displays a screen form. It's used to enter task duration, resources, start- or end-date constraints, and links to other tasks. To make sure proper links between tasks are entered, the logic can be graphically illustrated in a separate window. From any point in the program, there's a full screen of context-sensitive help available, and the tutorial will help you learn the package. We rate ease of learning very good.

The unique window interface allows the project to be seen from any number of perspectives simultaneously. Windows can be separate or synchronized, and they can be independently scaled. The program's 12-character Work Breakdown Structure (WBS) gives you such flexibility in reporting. To speed input, the program automatically creates the proper masks for the WBS code, complete with dashes or other delimiters. We rate ease of use very good.

Pertmaster Advance issues error warn-

ings at the bottom of the screen. They inform you exactly why something will not work, such as when you attempt to create a holiday on a day that is already a non-work day or when you want to enter a duplicate task code. Loops and missing nodes are also detected automatically. We rate error handling excellent.

Free telephone support for 90 days (not toll free) is complemented by optional on-site training and extended support (for a fee). There is a newsletter and a 30-day money-back guarantee. We rate support policies good.

We contacted technical support immediately and received prompt responses to our questions. We rate Pertmaster's technical support satisfactory.

With a cost on project, Pertmaster Advantages itself as a strong contender. Yet it offers stronger resource modeling, calendars, and easier operation than many of its competitors. At \$1,495, the next to lowest cost in the group, we rate value very good.

Primavera Project Planner

VERSION 3.2

At first glance, Primavera Project Planner doesn't match up to the other packages in our report. There's only one calendar (Version 3.2, released after our deadline, has three calendars), the shortest activity duration is one day, and graphics are extra.

But that's where the shortcomings stop. The program handles unlimited resources and 10,000 activities using popular project management diagramming methods (activity-on-node or activity-on-arrow). You establish a baseline schedule and compare it to multiple target schedules.

Primavera Project Planner excels at resource management. For each resource, you establish six levels of normal and maximum availability. You select any of 40 resources to be leveled during each run. If a resource conflict occurs, activity codes can specify which activity codes should be assigned resources first. We rate Primavera Project Planner's features and flexibility good.

Primavera Project Planner operates more smoothly and swiftly than its competitors. There's a delay as you switch between commands. Project scheduling, however, took a bit longer than average at 30 seconds. But that is balanced by extra capabilities such as allowing activities to complete even if

PRODUCT SUMMARY

Pertmaster Advance

VERSION 2.1

Company: Projectrion, 4546 El Camino Real, Suite 324, Los Altos, CA 94022; (415) 966-1527.

List Price: \$1,495.

Requires: IBM PC or compatible; 480K or RAM, DOS 2.0 or later, DOS 3.0 recommended; hard disk.

Price: Same; spreadsheet-style interface; multiple windows; inexpensive; subprojects; priority resource leveling.

Cons: Limited capacity; few reports.

Summary: Pertmaster's simple operation and multiple windows provide good decision support for smaller projects.

their predecessors haven't. Resource-leveling time took the longest of any product at three minutes and 12 seconds. Overall, we rate speed satisfactory.

The program smoothens resource use within available float time, then produces a report so you understand why an activity was delayed: a lack of resources or a problem with preceding activities. Other report details include daily resource use, remaining duration, and total float time. (The addition of these features, according to the vendor, is one reason speed is somewhat slower than the competition.) Reports exhibit much versatility: They assign up to 20 different codes to each activity and then isolate, sort, or summarize activities in most any way you need. There is an optional graphics package, Primavision, available for \$1,500 that adds plotter/graphics support and lets you view graphics on-screen. Plotted graphics provide a very clear indication of a project's status by isolating the critical path and producing task information in a pleasing format. We rate output very good.

The user and reference guides are very well written and indexed. You work through the program using a demonstration project augmented by detailed on-screen help and a reference card. Documentation is rated very good.

Installing and configuring Primavera Project Planner requires about 20 minutes. Following setup, reconfiguration is simple using one of the two full-screen major menu groups. After selecting any menu area, a single-keystroke command line is your main interface to the system.

Not only are commands extremely consistent, but you jump to virtually any important screen without retreating to the main menu. For example, from the Activity Data screen you add task information, assign resources, review or edit budget figures, and view data presented as a histogram or Gantt chart. It's a real delight not having to waste time looking for commands, and we rate ease of learning excellent.

In addition to quickly flipping through screens to examine or modify project facts, Primavera Project Planner offers other convenient features. Type the first part of an activity or resource code, for example, and the system finds the item you want. Version 3.2 provides "point-and-shoot" power to pick items from a list, and tracing a chain of activities through a network is possible using single commands. This is vital since the program lacks an on-screen Pert diagram.

PRODUCT SUMMARY

Primavera Project Planner

VERSION 3.1

Company: Primavera Systems Inc., 2 Bain Plaza, Suite Cymwyd, PA 19004; (215) 667-8600.
List Price: \$2,500; Primavision, \$1,500.
Requires: IBM PC or compatible; 512K of RAM, 840K recommended; DOS 2.0 or later, DOS 3.0 recommended; hard disk.

Pros: Easy data entry and general operation; extensive coding for reports; multiwindowing; excellent graphics. **Cons:** Limited calendars; need finest hour to schedule in hours or minutes; Periodic updates necessary for earned value analysis.

Summary: Best overall project manager due to flexible resource leveling and scheduling and simple operation.

The auto-cost feature is helpful, too, since it calculates real costs of completing a project from any point in the schedule. With easy reporting and command access, we rate ease of use very good.

Logic errors and resource problems, especially, are noted on-screen or in printed reports. Data entry errors are caught before doing damage; you can't enter duplicate task IDs, for instance. However, data files are saved as you make changes, so it's possible to run out of disk space without having a chance to back up files. Error handling rates good.

Primavera Systems includes free telephone help for one year, a newsletter, and upgrades. An annual support contract is

available after one year. Five-day training courses are sponsored throughout the year in major cities. There is bulletin board support, and corporate support is available. Support policies are very good.

The support staff was extremely well versed in the program and promptly answered our questions. They also took time to offer suggestions to improve scheduling. We rate technical support very good.

Primavera Project Planner doesn't rate tops in every category, but it's the clear overall choice. Functions are straightforward and accessible, reports are clear and easily customized, and the optional graphics are the best of the

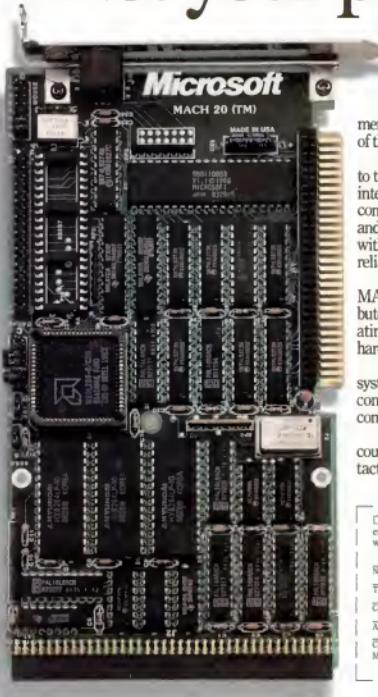
group. At \$2,500, Primavera Project Planner represents a very good value. Version 3.2, which recently began shipping but was not available in time for our review, includes a number of enhancements such as three (instead of one) calendars per project, a point-and-shoot help system, and the capability to summarize multiple projects into one master project.

Project Workbench — Advanced System

VERSION 3.0

Project Workbench-Advanced System is

Expand your PCs. Not your problems.



The Microsoft MACH 20 system consists of three modules: The MACH 20 Performance Enhancement Board features an 80286 microprocessor; The Memory Plus option gives you 512K RAM, expandable to 3.5MB; and The Disk Plus option lets you add one of the new high-density disk drives and create a slot for the MACH 20 system. Purchase only the modules you need.

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In a PC Week poll of '86 accelerator board users, MACH 20 received the top score in the four attributes deemed most important by respondents: operating system compatibility, software compatibility, hardware compatibility, and overall reliability."

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Microsoft
Making it all make sense.

a fine modeling tool when resources play the biggest role in a project. Resource allocations, including overscheduling, constantly show in a window below the Gantt display. Then, using interactive commands, you move a task or extend deadlines on-screen and watch the resource tally come into balance. Like Pertmaster, Project Workbench is more of a midrange package, both in price and features, and combines spreadsheet-type ease of use with some higher-end capabilities. It's a package best used when you don't need tremendous control of myriad details.

Project Workbench offers a range of other management aids, including support for a large number of activities (limited by disk space), 200 resources per task (with their own calendar), resource leveling across multiple projects, a built-in text processor, and local area network (LAN) capability. You can record the actual expenditure of time by resource, indicating the actual time period in which each effort was expended.

The program concentrates its power on resource assignments. The amount of work that resources perform each day is controlled and optimized using five loading patterns: fixed, front, back, uniform, and contour. For example, the front-loading resource pattern schedules as much work as possible at the beginning of the task. In general, features and flexibility are complete, and we rate them satisfactory.

For the most part, Project Workbench allows you to work without delay. As tasks are shifted on the time line, resource figures instantly update. You scroll from one part of the Gantt chart to another with little lag, and calculating our critical path took seven seconds (with the schedule entirely in memory). This time slows as you overflow into disk space, but you can flag a certain range of tasks for scheduling.

Resource leveling covers the entire current schedule or can include other projects. But it proceeds very quickly, and our project took only eight seconds. We

rate speed excellent.

With only eight categories, Project Workbench reports are its one weak link. The Gantt and Pert charts provide only brief information and hard-to-follow graphics. Printers and plotters are supported. Output is satisfactory.

Release 3.0 contains redesigned documentation that turns out to be the best of the group. The separate study guide features tutorials at two levels, each with detailed instructions and well-illustrated examples. A companion reference guide follows the same clear format, explaining each command in understandable language. There's a separate chapter on LAN installation, and each manual contains a complete index. A stand-alone diskette complements the written material. We rate documentation excellent.

Project Workbench installs for a single user or network in about 10 minutes. A spreadsheet-format command line and message area at the top of the screen make Project Workbench easy to learn and quick in which to maneuver. Projects

are organized in a hierarchy of phases, activities, and individual tasks. While not exactly an outline format, this makes it simple to break a project into major components.

Displays are neatly arranged; you page through stacked data entry and report forms. Establishing calendars, resources, and links between activities should take only a few hours for a modest-size project. Project Workbench is easy for the beginner, and we rate ease of learning very good.

In keeping with the program's resource orientation, histograms are exceptionally flexible, allowing you to see total use and individual allocations side-by-side. Switching to other resources or scrolling along the time line takes only one keystroke.

Project Workbench offers limited task relationships: finish-start, along with lead and gap time. However, a task can be scheduled to start, stop for a specified time, and start again.

Facts about multiple projects can be

FEATURES

**INFO
WORLD**

High-End Project Management Software

	Artemis Project	Open Plan	Pertmaster Advance	Primavera Project Planner	Project Workbench	Qwiknet Professional	Viewpoint
Tasks and Resources							
Tasks/project	64,000	10,000	2,000	10,000	Unlim.	5,000	32,000
Resources/project	255	U/500	Mem/Ltd.	Unlim.	200	Unlim.	32,000
Resources/task	255	U/250	Mem/Ltd.	Unlim.	200	100	32,000
Leveling over multiple projects	■	■	■	■	■	■	■
Selective resource leveling	■	□	□	■	□	■	■
Planning Capabilities							
Activity-on-node netwk.	■	■	■	■	■	■	■
Activity-on-arrow net.	■	■	■	■	□	□	□
Baseline schedule(s)	1	1	Unlim.	Unlim.	1	2	1
WBS codes	■	■	■	■	■	■	■
Resource codes	■	■	■	■	■	■	■
Subprojects	□	□	■	□	■	□	■
Multiple calendars	■	■	■	■	■	■	■
Minimum work unit	Hour	Minute	Minute	Day	Hour	Hour	Day
Calculates total float	■	■	■	■	■	■	■
Calculates free float	□	■	■	■	■	■	■
Compatible File Formats							
Time Line 3.0	■	■	□	□	■	□	□
ASCII	■	■	■	■	■	■	■
DBase	■	■	■	■	■	■	■
Microsoft Project	□	□	□	■	□	■	■
1-2-3	■	■	■	■	■	■	■
Editing Capabilities							
Interactive Gantt	□	□	■	■	■	■	■
Interactive Pert	250 Act.	■	■	■	■	■	■
Search/filtering	■	■	■	■	■	■	■
Split screen or windowing	□	■	■	■	■	■	□
Reporting							
Gantt chart	■	■	■	■	■	■	■
Pert network	■	■	■	Opt.	■	■	Opt.
Time-scaled logic diag.	□	■	■	■	■	■	■
Histograms	■	■	■	■	■	■	■
Earned value analysis	■	■	□	■	□	■	■
Other							
Mass update	■	■	□	□	□	□	■
Macros	■	■	□	□	□	□	□
Plotter support	■	■	■	Opt.	■	■	Opt.
Multiproject summary	■	■	■	■	■	■	■

combined into one report such as a master Gantt chart or a resource summary that shows utilization among many jobs. With few dependency types and only basic graphics, but with otherwise full-featured, convenient operation, we rate ease of use good.

Project Workbench handles problems tactfully. If you try to enter invalid dates, for instance, you'll be clearly informed what is wrong. There are confirmation steps when deleting portions of the schedule or an entire project, so it takes real effort to lose data. There is no Recovery (Undo) command to retrieve information once it has been erased. Overall, we rate error handling very good.

Unlimited telephone support is free on a regular basis. There is a three-month product-usable warranty; afterward, the vendor offers a fee-for-client support program extending the warranty for 12 months, leading to the next release at no charge, and provides application utility programs. There is a newsletter, and you can participate in classroom training, consulting services, or user groups. Support policies are very good.

The hot-line staff offered prompt, courteous attention. We inquired about several scheduling options and LAN installation, receiving correct replies immediately. They provided lots of hints about working with the package, and support was well above average. We rate technical support very good.

PRODUCT SUMMARY

Project Workbench — Advanced System

VERSION 3.0

Company: Applied Business Technology Corp., 361 Broadway, New York, NY 10013. (212) 219-8945.

List Price: \$1,275.

Requirements: IBM PC or compatible; 480K of RAM, 640K recommended; DOS 2.0 or later; DOS 3.0 recommended; hard disk.

Pros: Easy to use; interactive resource allocation and scheduling; inexpensive; LAN support; individual resource calendars.

Cons: Limited reports, cost information, and graphics.

Summary: Project Workbench provides interactive "what if" modeling for optimum resource use, although it does not match the power of other high-end packages in budgeting and tracking.

PERFORMANCE CHART

High-End Project Management



Tests of an 84-task project on an 8-MHz Compaq Deskpro 286 with a 40-megabyte hard disk and a Compaq enhanced graphics board.

Project Workbench is simple to use, yet reports are limited and there is little financial data capability and basic graphic output. For planning projects that revolve more around resources than finance or detailed task interrelationships, however, Project Workbench is definitely worth consideration.

At \$1,275 Project Workbench may be somewhat overpriced for single users, considering the sophisticated capabilities of Timeline and other lower-cost packages. As a LAN package, the value is significantly better. We rate value good.

Qwiknet Professional

VERSION 1.3

Qwiknet Professional is a project management package that emphasizes departmental computing with LAN support; file export to Project/2 (PSDI's mainframe/minicomputer software); and resource leveling across 250 projects (held in memory at once), drawing on a common resource pool. The program supports expanded memory, but rather than using it to hold additional tasks (projects are limited to 5,000 tasks), extra precision is available. You can schedule down to the hour and select from seven calendars for activities and resources.

Three work breakdown fields and one resource code field help to tailor various resource and cost summary reports. Of the 12 cost reports available, the estimate

at completion, budget to date, and earned value are especially noteworthy. Costs are summarized over multiple projects and can total over \$2 billion. Qwiknet provides nice scheduling flexibility such as positive and negative float, summary activities, and two target schedules for performance tracking. Another benefit is priority tracking, which ensures certain tasks are completed first, independent of leveling or other constraints. We rate flexibility good.

Qwiknet Professional is very fast. A minor drawback is that you must compute the entire schedule, but it only took three seconds for our project. Resource scheduling offers two options: time-constrained and resource-constrained. But, again, there's no way to limit calculations to a particular period. Resource leveling for our project required 10 seconds. We rate speed excellent.

The optional graphics module's Gantt chart was difficult to read, and the Pert chart lacks the polish of other packages. (In Version 1.4, shipping as we went to press, the graphics module and main program are combined and cannot be purchased separately.) Printed reports offer earned-value analysis in various ways, such as by period, and as a graph. Printer and plotter support are available. We rate output satisfactory.

Documentation includes a diskette and printed tutorial, a keyboard template, a reference guide, and a pull-out menu card. The manuals follow a step-

by-step approach and are loosely grouped into major areas such as reports and scheduling. The index is incomplete, so you'll spend some time looking for commands. We rate documentation good.

The program's mouse-driven menu interface helps in learning the program.

PRODUCT SUMMARY

Qwiknet Professional

VERSION 1.3

Company: Project Software & Development Inc., 20 University Road, Cambridge, MA 02138; (617) 661-1444. **List Price:** \$1,995; Qwiknet Graphics, \$695. (In the new version, 1.4, the main program is only sold in combination with the graphics module for one price: \$2,500.)

Requirements: IBM PC or compatible; 512K of RAM; DOS 2.0 or later; DOS 3.0 recommended; hard disk.

Pros: Individual resource and activity calendars; multiproject resource leveling; subprojects.

Cons: No free-float calculation; time-consuming data entry; poor graphics.

Summary: Qwiknet features strong resource leveling and cost consolidation over multiple projects, and it offers VAX and LAN versions. A new version (1.4), which is not copy-protected, is now shipping.

Art Director



Project Workbench histograms let you see individual project allocations and total use.



In Qwiknet you can view Gantt and Pert charts along with a resource histogram.

Basic commands, such as scheduling and graphic displays, remain consistent and accessible at the top of the display; options specific to a particular procedure appear at the bottom. Clicking on any option drops down a menu of additional choices.

You select and move multiple windows anywhere on the display. So it's possible to view Gantt and Pert charts along with a resource histogram.

Guided by the tutorial, you can create a small project in about 30 minutes. Unfortunately, there are myriad data entry forms and inconsistent coding between forms, which results in slower going when entering larger projects. All in all, we rate ease of learning good.

Qwiknet Professionals provides many scrolling fields — and the capability to clip information from one form and drop it into another. This saves time since rekeying is eliminated. We rate ease of use good.

Qwiknet checks for logic errors such as loops and unconnected activities. Error reports, directed to a disk file or printer, consume time or require extra steps to view. We rate Qwiknet's error handling satisfactory.

You receive one year of free support and updating, which includes a toll-free support hot line, newsletter, and bulletin board access. Also available is a for-fee training program and yearly support subscription service. Support policies rate very good.

The support people were accessible and knowledgeable, and the bulletin board (with a limit of one hour per day) contains useful hints and updates. We rate technical support satisfactory.

Qwiknet Professional's detailed reports, multiproject calculations, and numerous scheduling options merit a look, especially if you require a tie-in to a DEC VAX or LAN. Even with some learning and operating shortcomings, at \$1,995



Viewpoint's features are nicely designed, such as this calendar setup screen.

(\$2,500 for the new version which includes graphics) the program is less expensive than some powerhouses in this range. We rate value good.

Viewpoint

VERSION 3.1

Viewpoint is a true workhorse, handling 32,000 tasks. Its mouse-driven interface makes this power very accessible. You work interactively on a Planning screen, creating major project phases and recording details using subprojects. Furthermore, a specific task in one subproject can be linked to a task in another phase without losing its individual identity.

Unlimited resources can be added to each task. Task connections are start-to-

start, finish-to-start, and finish-to-finish — with any amount of lag time possible. Version 3.1 includes extensive import/export capabilities, and we rate features and flexibility very good.

Version 3.1 was quite speedy, and our benchmark project's schedule took just over 10 seconds to calculate. Viewpoint handles overscheduling in typical fashion, by smoothing resource assignments over tasks. Additionally, you constrain work hours by simply tracing a line (indicating maximum work hours) directly on the resource histogram. Manually adjusting one resource's work schedule is possible. Leveling required 29 seconds. Viewpoint's speed earns a very good score.

A Gantt time line is available — plus histograms of resources and expenses. Tabular reports of just about any aspect

PRODUCT SUMMARY

Viewpoint

VERSION 3.1

Company: Computer Aided Management Inc., 1318 Redwood Way, Suite 210, Petaluma, CA 94952; (800) 635-5621, (707) 795-4100 in CA.

List Price: \$1,995; graphics, \$995.

Requires: IBM PC or compatible; 512K of RAM; DOS 2.0 or later; hard disk. **Prev:** Unlimited tasks and resources; 10 calendars; histograms; simple mouse-driven interface; quick calculations; subreports.

Cost: Pert chart can become cluttered; extra-cost graphics module.

Summary: Viewpoint 3.1 is a workhorse program that also provides quick and simple operation. Resource leveling and constraining is very complete.

of the project are available, including earned value, monthly expenses, and schedule dates. If the built-in library isn't adequate, a custom report generator helps fill in the gaps. An optional graphics module (\$995) generates the Gantt chart, Pert chart, work tree, and network chart. Printers and plotters are adequately supported. We rate Viewpoint's output good.

Viewpoint's single manual familiarizes you with basic commands by building a small project. More sophisticated topics are gradually introduced, and advanced techniques follow the same well-illustrated tutorial format. A quick-reference card, a keyboard overlay for function-key shortcuts, an index, and an appendix complete the printed material. Three interactive disks complement the printed manual. Enhanced by the complete, concise, and coordinated nature of the program's instructional programs, we

REPORT CARD

High-End Project Management Software

	(InfoWorld) (Your weightings)	Artemis Project	Open Plan	Pertmaster Advance	Primavera Proj. Planner	Project Workbench	Qwiknet Professional	Viewpoint
Price	\$3,500	\$4,200	\$1,495	\$2,500	\$1,275	\$1,995	\$1,995	\$1,995
Performance								
Features/flexibility	(125) ()	Very Good	Good	Satisfactory	Good	Satisfactory	Good	Very Good
Calculation speed	(75) ()	Good	Good	Very Good	Satisfactory	Excellent	Excellent	Very Good
Output	(75) ()	Good	Very Good	Good	Very Good	Satisfactory	Satisfactory	Good
Documentation	(150) ()	Satisfactory	Good	Satisfactory	Very Good	Excellent	Good	Very Good
Ease of learning	(125) ()	Poor	Good	Very Good	Excellent	Very Good	Good	Very Good
Ease of use	(200) ()	Satisfactory	Good	Very Good	Very Good	Good	Good	Very Good
Error handling	(75) ()	Good	Good	Excellent	Good	Very Good	Satisfactory	Very Good
Support								
Support policies	(75) ()	Good	Good	Good	Very Good	Very Good	Very Good	Excellent
Technical support	(50) ()	Very Good	Very Good	Satisfactory	Very Good	Very Good	Satisfactory	Satisfactory
Value	(50) ()	Satisfactory	Good	Very Good	Very Good	Good	Good	Very Good
Final scores	5.5	6.4	6.6	7.3	7.2	6.3	7.4	

Use your own weightings
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GUIDE TO REPORT CARD SCORES

InfoWorld reviews only finished, production versions of products, never beta test versions.

Products receive ratings ranging from unacceptable to excellent in various categories. Scores are derived by multiplying the weighting (in parentheses) of each criterion by its rating, where:

Excellent = 1.0 — Outstanding in all areas.

Very Good = 0.75 — Meets all essential criteria and offers significant advantages.

Good = 0.625 — Meets essential criteria and includes some special features.

Satisfactory = 0.5 — Meets essential criteria.

Peer = 0.25 — Falls short in essential areas.

Unacceptable or N/A = 0.0 — Fails to meet minimum standards or lacks this feature.

Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10 (plus bonus). Products rated within 0.2 points of one another differ little. Weightings represent average relative importance to InfoWorld readers involved in purchasing and using that product category. You can customize the report card to your company's needs by using your own weightings to calculate the final score.

rate documentation very good. You should feel comfortable with Viewpoint's operation within a day. All three mouse buttons are used, which can be difficult to get accustomed to. If you have a two-button mouse, the "third button" is both buttons pressed simultaneously. However, the three-button method lets you select on-screen commands, pop-up additional menus, and confirm choices with little effort once you're accustomed. Windows containing forms and subforms are used extensively and quickly appear. Overall, we give Viewpoint a very good score in ease of learning.

In addition to task bars that indicate duration, Viewpoint screens display slack time, whether leveling has been performed, and the direction in which work flows through various project levels. One of the many shortcut keys, F10, toggles to

local mode; only data in the active network is displayed, thus eliminating needless scrolling to be performed during editing.

In many forms, such as resources and reports, Viewpoint offers a list of names you've entered or predefined formats. Selecting information in this manner saves time and reduces typing errors. On the histogram you can point to any bar to see the cumulative hours a resource has worked, totalling the total dollars allowed up to that point in the schedule. These advantages contribute to a very good ease-of-use score.

Error and confirmation messages identify logic loops, dates out of sequence, and other problems. You're warned of the consequences of an action for example, all activities below a particular network will be deleted — and given the option to cancel before proceeding.

In some cases you can also undo an operation. We rate error handling very good.

On an unusual move, the vendor includes three days of classroom training in the cost of the package (you pay travel expenses), plus low-cost upgrades and toll-free telephone support. There is also a newsletter and a money-back guarantee. Technical support is available from 7 a.m. to 7 p.m. Pacific time. Support points rate excellently.

We talked to the staff on several occasions, always without delay. The technicians were helpful and friendly, and we rate their technical support satisfactorily.

Viewpoint offers ease of use more typical of less-expensive project management packages but with all the power demanded of high-end programs. At \$1,995, Viewpoint is a very good value. □

Executive Summary

If microcomputers had existed when Egyptian pyramids were constructed, high-powered project management packages could have easily managed the job. Whether you need one of these powerhouse packages will be influenced by a number of factors. Certainly, you're in this league if projects you manage involve several thousand tasks and up. Extensive financial reporting, elaborate resource shuffling, and boardroom-quality plotted graphics are other benefits that are not generally available with lower-end project management programs.

With its high price, the package you choose is one you'll likely live with for a while. Unfortunately, making that decision involves trade-offs between functionality and ease of learning and use.

The seven programs we examined fit into different categories. Some of them have exceedingly difficult or cumbersome interfaces yet great power. Others sport simple interfaces but are constrained by only modest capabilities. A final group tries to strike a balance between these two poles.

Within these classes are specialized capabilities such as open, database designs, interfaces to mainframe or minicomputer systems, and detailed cost analysis commonly required by government contractors.

Primavera Project Planner is a clear leader in the group. What it lacks in capacity or specific features, such as numerous calendars, is more than compensated by streamlined operation, flexible reporting, and excellent graphics. Add-on modules satisfy Department of Defense requirements and scheduling over short periods.

Viewpoint is also a clear leader, providing fast operation — especially with very large projects. There are, however, numerous data-entry forms and a mouse-driven interface requiring three-button dexterity. In addition, the optional graphic module's output lacks polish. Yet with its large capacity and interactive project layout tools, Viewpoint is preferable over the more involved packages.

Qwiknet's task capacity is low, and resource assignments are determined by system memory, although it is very speedy. While data entry windows are employed, navigating

through the many forms can quickly become tedious. Qwiknet provides individual activity and resource calendars and variable resource capacity. But it only has fair graphics and is overshadowed by other programs.

Permaster Advance is one of two programs in this report that satisfy both casual and power users. Its spreadsheet interface, multiple windows, and flexible Work Breakdown Coding provide both convenient operation and elaborate reporting. It did well in calculation speed. Project size and resources, however, are limited. Because of this and its cost, you're probably better off selecting a lower-end package for moderate-size projects.

Project Workbench is the other package combining spreadsheet simplicity with big-system features. In fact, Project Workbench is second only to Timeline in overall popularity. Project Workbench lets you interactively juggle resources while project size is limited only by disk space. Moreover, the system comes LAN ready and is as fast as lightning. Reports

are sparse, though, as are graphics, so it's best used where you don't need to monitor a lot of detailed data.

Open Plan, as its name implies, is open to extensive modification since it's written in DBase. There's a wide range of capabilities like micro scheduling (for minute-by-minute precision), good capacity, and optional probability analysis. The interface is somewhat cumbersome and graphics only fair. Where Open Plan excels is in reports, since you can sort and reorganize in myriad ways. And, DBase-literate users will appreciate the option to create custom screens — or even revamp the entire application.

Artemis has much going for it in features, flexibility, and brawn — except a way to get at the power. The interface is, without question, the most difficult of the group. Artemis handles enormous projects — up to 64,000 tasks — and provides the most extensive earned-value reporting. However, its slow performance and frustrating operation will make the program unacceptable for many users.

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FIRST LOOK ■ BY MICHAEL J. MILLER

1Dir Plus Is Still the Most Customizable DOS Shell Available

Many people find MS-DOS commands just too complicated, which is why there are so many DOS shells. Most users also just want a way to run the programs on their hard disks, so we've seen many "menu makers" as well.

Bourbaki's 1Dir Plus (pronounced "wonder plus") was a pioneering DOS

shell and has long included menu-making features. Version 3.0 makes the menu-making features much easier to use and adds even more options to the most customizable DOS shell I've seen.

1Dir Plus now has eight initial faces — various ways that the program can look on-screen. An initial Quick-Reference face shows you a list of your files. A Statistics face adds information about the amount of space used and left on the disk

drive and in memory. An Extended face shows the full directory entry (including size, date, and time) for each file. You can see a wide directory, two directories at once, or all files sorted by directory. You can also use a very simple Menu face, or a DOS face that looks just like DOS.

From these faces, you can enter DOS commands from a command prompt; see a tree structure of your drive; and point and shoot through your directory, selecting

the files you want to work with. 1Dir Plus lets you perform the basic file management tasks. A directory-personality feature lets you set up each subdirectory so that you only see certain files, sorted in specific ways, or only files within certain date ranges.

Several of these features have been improved in Version 3.0. The Double Directory face is new, as is the capability to show statistics, such as space used, from within the tree. The Global Directory face now shows all the files that match a particular specification in a single list, as well as a list of duplicate files.

The excellent editor now works with any file that can fit in memory (rather than the old 64K limit). You can set screen colors and the width and number of lines per page, turn word wrap on and off, search and replace, etc. New is the capability to search a group of files to find those with a particular string in them.

The menu-making features are now more powerful and easier to use. A new generate feature scans your disk for programs that 1Dir Plus knows about, to add to the basic menu of programs. You can add other programs, and customize keystrokes, input, and colors. You can set passwords for specific menus and commands, and also set a password to log on.

Nearly all these features exist in other DOS shells and menu makers. What makes 1Dir Plus unusual is the diversity and depth of the individual features, and its extensive customizability.

1Dir Plus lets you choose the default menu for start-up; choose your own colors and special start-up text; change the keystrokes; and set the program to stay in memory, reside on disk, or use EMS memory. It works particularly well where one person sets up multiple PCs, since it can be set to provide different classes of users with different capabilities. It also can be configured in different ways for multiple users on the same network.

The price for all this is complexity. 1Dir Plus has many more options than competing DOS shells, and it's easy to be overwhelmed. The program uses multiple function keys and control-key sequences, and all the commands aren't listed in any single menu; it comes with a quick-reference card, tutorial, and on-line help, but it takes a while to figure it all out. For instance, selecting a group of files to copy (such as all *.WKS files from a particular 1-2-3 subdirectory) isn't as intuitive as in Xtree Pro or Norton Commander.

The new version adds mouse support, which is a nice touch, though you still must learn to click in particular areas on-screen to get the desired results. One feature I missed is the capability to view the contents of 1-2-3 and Dbase files, as you can with Norton Commander.

1Dir Plus is very powerful and perhaps the most flexible of DOS shells and menu makers, but it's nowhere near as simple to use as Norton Commander. If you just want a simple DOS shell, look elsewhere. If you're looking for a sophisticated DOS shell or a powerful tool to customize and set up other people's machines, 1Dir Plus makes a lot of sense.

1Dir Plus, Version 3.0 is quite well priced at \$95, and is available now from Bourbaki Inc., 615 W. Hwy St., Boise, ID 83701; (208) 342-5849.

First Look examines new personal computer products before they have been through a formal review.

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IMPRESSIONS

Pubtech File Organizer Brings Macintosh Look to Microsoft Windows

A few years ago, a gangle of DOS file organizers appeared on the market, attempting to make the cryptic DOS easier to use. Now we're seeing a burst of file organizers aimed at Microsoft Windows, whose own file manager, called the Executive, has its shortcomings.

Pubtech File Organizer lets you manipulate and edit files, but the most pronounced feature is the program's iconographic and operational similarity to the Macintosh desktop. Pubtech includes such Macintosh-like features as a "garbage" icon (known as "trash" in the Macintosh world) for throwing away files, which grow fat when it contains a discarded file; selectable icons; the capability to "clean up" one selected icon or an entire window of icons (the system default switches automatically, just like the Macintosh); and the capability to list files based on their order or icon size (Windows offers a more limited form of this feature). Using the mouse, icons can be selected and moved around the desktop or to a new folder.

Yet the Pubtech File Organizer is certainly not identical to the Macintosh desktop. You can tell you're working with an IBM PC because no matter what you do you're still in Microsoft Windows, there are DOS commands and subdirectories to deal with, and the "feel" of the program is still very un-Mac-like.

As a file manager, there are a reasonable number of features and options. As mentioned, you can move and copy files by clicking and dragging them across directories — much more expeditious than typing in the name DOS-style. Since the program encourages you to manage unwanted files by dumping them in the garbage, if you wait to empty the garbage until the last minute you can retrieve, or undelete, files you decide you need.

With Search File, Search Text, and Search and Replace, files and text in files can be located anywhere on the disk. In the Application menu, you can load non-Windows programs as well as commonly used Windows applications such as Clock, PageMaker, Ami, Calendar, etc., and choose them — no matter what subdirectory they're in — by simply clicking on the name or hitting command key. This path-name-independent approach is very handy if you get tired (as I do) of jumping among subdirectories to access applications.

Perhaps my favorite item in Pubtech is word processing: the ASCII-style Text Editor lets you copy, cut, paste, save, and revert (just like an Undo command). In word processor style, you can choose fonts and alter page formatting (left, right, justified text, word wrap, etc.). If you simply want to sit down and crunch text into an ASCII document for inclusion in another document, this is a fast way to do it. Pubtech's a lot of frills though as a spelling checker or outline, but you can time and date stamp, assign macros, or emulate command keys of several popular word processors such as Wordstar and Displaywrite. While Windows Write is much more of a WYSIWYG word processor, Pubtech's Text Editor in many ways is more powerful and is an ideal tool for preparing desktop publishing text before laying it out in PageMaker or even Ami.

A few complaints: When you point and click on a menu item and it changes color, occasionally the lower half of the



Pubtech File Organizer's Mac look includes a garbage can for discarding files and auto-loading of a variety of programs.

chosen item retains its colored highlighting. Another problem I had (only rarely, however) was when clicking on the C:Drive icon, the mouse sometimes would not let go of the icon; whenever I moved the cursor, the icon followed, and ultimately I had to restart the system.

After making changes in various dialog boxes (such as for assigning various applications to the Applications menu), clicking "OK" will choose the selection, but when you are done you must hit "Cancel!" — which could be construed as hindering your choices. A better way might be to have three dialog buttons: Cancel, OK, and Accept, to leave the box and accept changes. The vendor says all these problems are being addressed and a new version (2.1) is due for release in mid-March.

Minor gripes aside, Pubtech's File Organizer is a very useful tool. While you will have to get used to the proliferation of icons and adapt to more of a Macintosh-style of operation while still knowing MS-DOS terminology and operation, the File Organizer most assuredly cases things. Additionally, the manual is exceptionally complete for a utility — it includes a fine index, a tutorial for the Text Editor, and comprehensive instructions for all program operations.

The Pubtech File Organizer is \$145. The upcoming release, which will contain additional features, will be \$195. An OS/2 version will also be available later this year for \$395.

Publishing Technologies Inc., 7719 Wood Hollow Drive, Suite 260, Austin, TX 78731; (800) PUB-TECH.

—Serge Timacheff

Automator

DIRECT TECHNOLOGY

Automator is a slick, new software application that provides automation or customization of any process on a PC. Much more than a macro designer or small customization program, it is also a universal scripting language, allowing you to do very technical programming without ever knowing or using a programming language.

Automator uses workstation integra-

tion advantage of the time when no one is using the computer. Information downloads or software tests can be programmed to take place throughout the night, for example.

Automator excels at increasing productivity and making use of previously wasted computer time, but its \$1,995 price is a bit steep for some budgets. But medium-to-large-size companies might find Automator's benefits outweigh the initial investment. Automator needs 83K of RAM, and the \$1,995 price includes the development pack and run-time license. Site licenses are also available.

Direct Technology, 10 E. 21st St., Suite 1204-5, New York, NY 10010; (800) 992-9979, (212) 475-2747 in NY.

—Lauren L. Black

Book Review: Upgrading And Repairing PCs

QUE CORP.

When I was an undergraduate at UCLA, many years ago than I'd like to think about, I had a professor assign a textbook. He recommended the book not just because it covered the subject matter for the course, but "because it's one of the best books about any subject that you can find."

In many ways, the same description seems to apply to *Upgrading and Repairing PCs* by Scott Mueller. It's an exceptional book, covering most of what you'd ever need to know about how to repair and upgrade a PC, and even information about how the darned works.

While related most directly to the models of ISA and Micro Channel Architecture computers from IBM, coverage of general architecture, peripherals, and basic design of most clones makes the book useful for anyone interested in his or her computer, and an interesting read for just about anyone else.

The book has surprising depth, covering broad topics (how to install expansion boards, preventive maintenance, and installation of subsystems) and other details with exceptional clarity. Although I'm something of a hardware specialist, I keep finding explanations of items that weren't obviously clear to me, as well as finding important but little-known facts. (For example, why you should never try to format a low-density floppy disk for 1.2 megabytes, and why you should always pass your computer through X-ray at an airport, rather than walking it through the metal detector.)

For anyone interested in computers and the technology behind them, the book is an excellent resource. As a resource for users or company guys who want to upgrade systems, the book will be of great value. *Upgrading and Repairing PCs* goes beyond explaining the hows, and discusses the whys of most system upgrades in generally clear, easily understood terms.

For \$24.95, *Upgrading and Repairing PCs* should be as useful a tool to the office computer whiz as a Phillips-head screwdriver. As one of the best books about the workings of personal computers that I've ever seen, it will be a useful, easy-to-read, and interesting addition to most anyone's library.

Que Corp., 11711 N. College Ave., Carmel, IN 46032; (317) 573-2500.

—Mark Brownstein

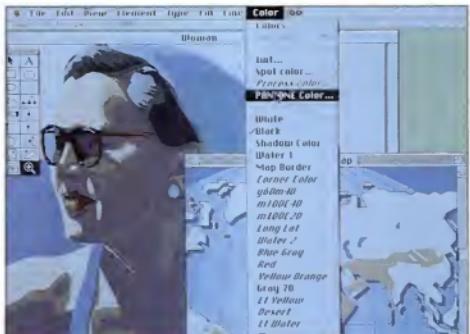
"Automator allows people who are not computer experts to get more out of their PC."

when I hit Ctrl-Alt-Del. It took less than five minutes, and I didn't have to type in one line of code. I had complete control over the display and was able to choose a variety of colors and sizes for the pop-up display box from a control panel. I used the program's learn mode to develop the entire procedure.

Another feature allows Automator to be set up as event-sensitive and instructed to look for four specific types of events: on-screen events, keyboard entries, system clock events, and a special "When-user" command. When-user (i.e., when user does this, then...) makes the computer wait for specific things you could do. For example, when you type "abcd," the computer can be made to display the time and date. These features allow the computer to execute event-specific commands before continuing a task. The results can be accurately timed and saved to a file for later use.

You can use Automator to take

REVIEWS



To set Freehand's colors, you can choose the Pantone standard color set or select your own spot or process colors using sliders in either RGB, CMY, or HLS models.

Aldus Freehand Update Has Edge Over Adobe Illustrator

Version 2.0 is a powerful graphics package with superior text handling, Pantone colors.

BY MICHAEL J. WARD REVIEW BOARD

FEATURES:
Freehand 2.0 lets you draw on the Mac screen in more or less the way you do in MacDraw. You can create complex drawings and print them out on your Apple Laserwriter or typesetter. You can work in full color on the Mac II, and Freehand will take your colors and automatically compute and print out four-color separations. On a color Postscript printer, it will generate color prints.

There are other ways, like bit maps, to create and print complex images; but Freehand defines your drawing in Postscript, which has two big advantages over bit-mapped graphics: It is independent of the final size of the drawing it describes, and its output resolution depends only on the printer and not on the level of detail you can see on your screen. Thus a single Postscript file can print a picture on a Laserwriter and print a larger or smaller version of the same picture, at much higher resolution, on a Postscript typesetter.

Freehand 2.0 requires a Macintosh with 1 megabyte or more of RAM (2 megabytes under MultiFinder), running System 4.3 or later and Finder 6.0 or later. (System 6.0.2 is recommended.) Use Laserwriter and Laserprep 5.2 or later.

PERFORMANCE:
The Freehand work analogy is a "page" lying on a "work space." The page is the area which your drawing will print out; it can be anything from one square to 40 squares. The work space is a comprising area surrounding the working page; you can put parts of the drawing there to try things out before you place them on the page. You can think of the screen as a drafting table with a sheet of paper on it.

When you open a file, Freehand displays a toolbox window on the left side of the screen with the usual drawing tools that you expect. There are also four unique tools for placing curve points, corner points, and connector points and a

combination tool that can place all three of those points. These tools are Aldus' secret weapon in the drawing of Bezier curves on the page. They are also the hardest part of the program to learn to use. You don't have to learn to understand exactly what is going on in the computer, but you will have to practice using these four tools until you can anticipate what the line you are drawing will do you move the mouse.

There are three new toolbox tools in this version: a magnifying glass, a knife, and a trace tool. However, they aren't completely new; all three do things that the earlier version could do but did not have explicit toolbox icons for. These are easier to use than the old methods were.

The menu bar has been restructured; a separate menu for type (face, size, style, etc.) has been added, and many of the menu items now show arrowsheads to pop-up submenus. Freehand commands also have strong similarities to Page-makers'.

Freehand can open Freehand 1.0 and Adobe Illustrator 1.1 files. It can directly open Postscript and encapsulated Postscript (EPS) files from other programs. It can bring in paint images such as those made by MacPaint, and it brings in and auto-converts PICT drawings like those in your clipboard or the ones that MacDraw can make. Freehand can also read and manipulate TIFF files with gray-

scale values, as you might get from a scanner, a video imager, or a high-end paint program.

Freehand has a complete, well-organized set of editing tools for creating and changing your drawings, and we rate them very good.

Freehand can be agonizingly slow when you are working with a complex drawing. You have the option to go to a skeletal representation when you need the speed, but this hides so much of the drawing that you may be confused. If this is a real problem, you can disable any layers you are not working with, and editing will be much faster. The first version had an infuriating tendency to redraw the screen at the slightest opportunity; this has been fixed.

As a comparative speed test, we took a standard, fairly complex Illustrator 1.1 drawing (the butterfly) and converted it to both Illustrator '88 and Freehand 2.0 formats. In Illustrator '88, it took about 100 seconds to reopen the program and display the full illustration. For the version converted to Freehand 2.0 format, opening the program and this file took 120 seconds to bring the full illustration. We judge the two programs now almost comparable in speed, with a slight edge to Adobe.

Everything on screen is an "element" of some kind; there is a full set of commands to let you move elements, trans-

form and reshape them, join or group them with others, lock them from further modification, and place them on any of the 200 different layers the program can address. For text, you can join paths, split them apart, move them, and transform them. Objects such as rectangles are groups of straight lines; if you ungroup the lines of a rectangle, you can distort its shape into a random quadrangle.

A block of text is an element, and it, too, can be resized, skewed, mirrored, and rotated. Type can be bound to straight, curved, or cornered lines, as in the first version. With this version you can control the stroke and fill of text letters independently. Freehand is still the preeminent product for font control.

You can create many different kinds of gradient (or graduated) fill patterns: linear or radial, patterned or tiled, or monochrome or color. This version has a new blend function similar to that in Illustrator '88; it will create intermediate shapes and colors between two objects you set as the endpoints. It is just as difficult to use as Postscript's is, and it has a tendency to slur complex paths.

With these features and functions, we rate Freehand's flexibility excellent.

Freehand 2.0 can define and use any of the colors that your Mac can work with. On a color Mac, it will display 8-, 16-, or 24-bit color depending on what color card you have installed. Setting the colors is easy, and you have your choice of using the Pantone standard color set (for spot colors), or spot or process colors you define yourself using sliders in the RGB, Cyan-Magenta-Yellow (plus Black), or Hue-Lightness-Saturation models.

The program will automatically compute the appropriate images for color separations for printing the drawing in accordance with the colors you have defined. You can add electronically generated dot or line screens to the image. You can even have it print registration marks on the separations.

Freehand has accurate and complete control over the screen display. We examined the Mac SE's standard 9-inch monochrome, the Apple standard color, and a 19-inch RasterOps color monitor. Display quality was limited only by the resolution of the monitors; we rate it excellent.

The print dialog box lets you scale the print, print it as a color separation, and set the overlaps if you are tiling a large drawing on smaller sheets. For high-precision and color work, you can print the emulsion side up or down, add crop and registration marks, and print the color names while doing separations. The output representation is a full-power Postscript implementation, and we rate output quality excellent.

DOCUMENTATION:
Documentation was one of the strong points of the first version, and it's even better today. Freehand 2.0 comes with a main user's manual, booklets on getting started with the program and on special issues in color printing, a set of cards with hints and tips for advanced users, and an animated tutorial disk that demonstrates how to use the program's main features.

We strongly advise users to sit down

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More Power Touch

No single word processor is perfect for all of your users.

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WordStar 5



and read through the manual before trying to do anything complicated. If you must start right away, read the first few chapters and the booklet *Learning Aldus Freehand* first.

There is no on-line help file, and we don't understand why. Freehand is not a simple piece of code. Even the experienced user will have to consult the manual from time to time; on-line help would be a godsend.

The documentation is thorough, but due to the lack of on-line help, we rate it no higher than very good.

EASE OF LEARNING:

Aldus has tried hard to make learning Freehand 2.0 easy. It has done a good job, and you can expect to start placing elements into drawings as soon as you install the program and work through the document setup procedures. The line, rectangle, and ellipse tools work as you would expect. However, to make use of the Postscript path features, expect to spend several hours learning what the four tools do and how they modify the lines when they place points.

The tutorial disk is a good start and shows you how to manipulate the major tools of the program. The booklet on color printing is one of the best introductions we have seen.

Most of the dialog boxes are self-

explanatory in their features; the color definition process is a notable counterexample. Aldus makes extensive use of pop-up menus in the dialog boxes and the menus, and simply clicking on these will usually make clear what they do.

It's a complicated program and it will take you a while to learn, but Aldus has provided enough help to make the job reasonable; we rate ease of learning good.

EASE OF USE:

In this version Aldus has improved the user's access to tools and menu items. They are better organized and more like other Macintosh drawing programs.

The explicit text menu is new; previ-

ously the user had to click up the dialog box and set the parameters there. You still cannot write directly to the screen, however; instead, you enter your text into a display box, which then gets interpreted and placed approximately where you last clicked the drawing. While in the display box, you can mix typefaces, styles, fonts, and sizes, if you wish, to achieve the "ransom note" effect. If you don't like the placement you can move, rearrange, and resize the text boundaries with the pointer.

You can now add fill patterns the same way you do in MacDraw and MacPaint; the lack of this was one of the things we disliked about the first version. You can

also generate Postscript patterns and textures, and they've included some texture and pattern samples in the clip-art files.

As before, you can display position rulers at the edge of the screen and define an invisible grid of snap-to points to help you position objects. You can also explicitly align elements to each other in many different ways from a dialog box with an excellent user interface.

In the first version it was a royal pain to import images from other programs; we frequently found ourselves restarting the auto-trace software in odd corners of MacDraw illustrations to make sure that we had caught all of the details. This

REPORT CARD INFO WORLD

MACINTOSH GRAPHICS SOFTWARE

Aldus Freehand

VERSION 2.0

Criterion	(Weighting)	Score
Performance		
Editing tools	(100)	Very Good
Flexibility	(200)	Excellent
Output quality	(75)	Excellent
Display quality	(75)	Excellent
Documentation	(100)	Very Good
Ease of learning	(100)	Good
Ease of use	(100)	Very Good
Error handling	(100)	Good
Support		
Support policies	(25)	Good
Technical support	(25)	Very Good
Value	(100)	Very Good
Final score	8.0	

PRODUCT SUMMARY

Company: Aldus Corp., 411 First Ave. S., Seattle, WA 98104; (206) 622-5500.

List Price: \$495.

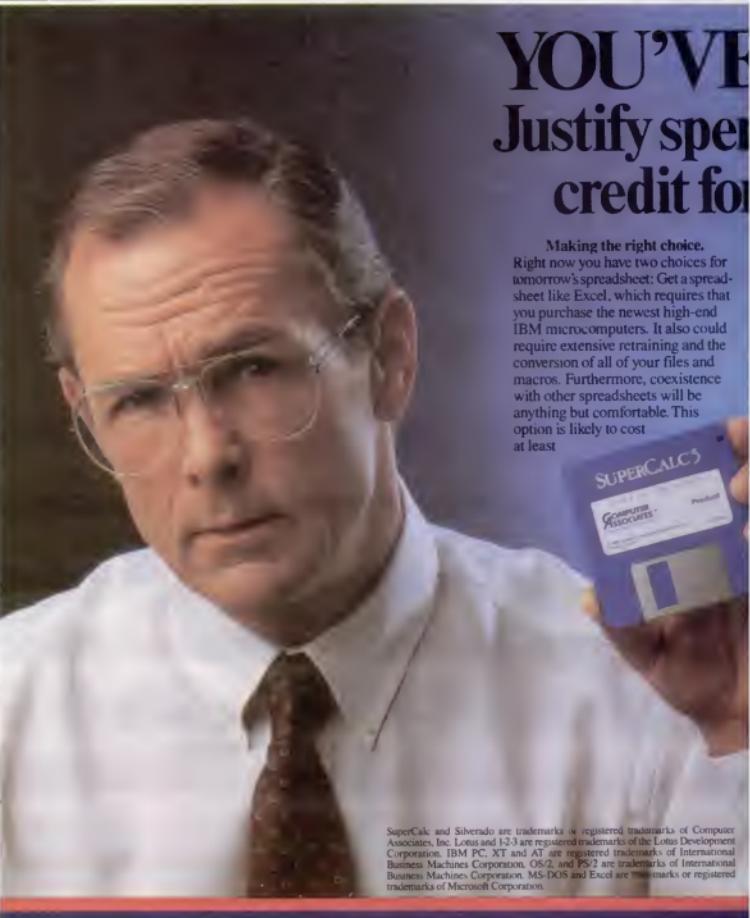
Requires: Mac II, SE, Plus with minimum 1 megabyte of RAM (2 megabytes for Multifinder); two 300K floppy disk drives or one floppy and one hard disk (recommended); System 4.3 or later; Finder 6.0 or later.

Support: 90-day warranty for media and performance; 45 days of free technical support.

Pros: Very powerful, flexible; full support for color printing; remedied most of what Version 1.0 lacked.

Cons: Slow with complex drawings; no on-line help.

Summary: Professional-level Postscript drawing program provides full command of on-screen and printed colors and patterns; a fine product.



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version simply does it automatically. We ran several sample conversions and found that they worked well. Most of the menu commands have command-key shortcuts, and most of the tools can be selected by typing a single number on the keyboard. You can convert different types of path-definition points using various combinations of the command and option keys. And you can always get the grabber by holding down the space bar.

There are a number of tools for modifying the gray levels in TIFF images and changing the way they print. Aldus includes auto-Posterize and Solarize special effects. You have a large amount of

control over how dense your output print will be, how it will be screened, and how large it will come out.

There are three ways to bring in images from other documents. You can place files in Mac Paint, PICT, and TIFF format; Freehand 2.0 will automatically convert them to its own format. You can also place EPS files; these will show graphically on the screen if the EPS file includes a screen version of the graphic; otherwise only a bounding box is displayed.

Aldus has added new and complex features and automated the most difficult of the old ones. There are more things to worry about, but the company has

streamlined its command hierarchy and made the program generally more usable. We rate ease of use very good.

ERROR HANDLING:

Freehand 2.0 will support up to 100 levels of Undo depending on your available memory (100 levels require 4 megabytes); with 1 megabyte of RAM it defaults to eight levels. This is usually plenty.

The program does not automatically save your file as you work, so take care to save often. When you quit the application or close a drawing, it prompts you to save your work if you have made changes since the last save.

We found Freehand exceedingly well-behaved and quite thoroughly debugged. Any error message you see will likely be due to Postscript problems. Unfortunately, Postscript error handling between the Macintosh and the Laserwriter is pretty bad. You can expect to see cryptic error messages on sheets that failed to print your drawing; refer to the Freehand user manual for help.

Freehand's error handling operates well. If Aldus would provide auto-save and incorporate better Postscript error messages, we would rate it even higher. As it is, we rate Freehand good in this category.

SUPPORT:

Aldus warrants that the software will perform substantially as it claims; if it fails and they can't fix it, they will refund all or part of your money.

Aldus has support plans for everyone, from single artist to corporate empire. At the lowest level, returning the registration card gives you 45 days of telephone technical support, from the date of your first call. You also get discounts on upgrades, a free trial on the Compuserve BBS (where Aldus has a forum), and free replacement of defective disks or manuals for 90 days.

For \$100, you gain access to an extended support plan with a toll-free number for a year, minor upgrades at no charge, and discounts on new versions of Freehand. If you have extended support on other Aldus products, the cost to add Freehand to the policy is reduced.

Although Aldus offers a feature-rich support package in its extended support program, as well as a performance warranty and BBS support, the very limited free support period prevents Freehand from earning a score better than good.

When we called their technical support number, we were routed via touch-tone numbers to the correct desk; we were then put on hold for 10 minutes. When the support person came on line, he proved to be both friendly and helpful. He was familiar with some of the more obscure aspects of applying Freehand images to different classes of printers. On another occasion a technician gave an excellent off-the-cuff explanation of a class of Postscript commands. Aldus seems to train its support personnel well; we rate technical support very good.

VALUE:

Freehand 2.0 lists for \$495, the same price as its earlier version and as Adobe Illustrator '88. The features we pointed out as missing in Freehand in the reviews of Freehand 1.0 (May 16, 1988, Page 68) and of Illustrator '88 (August 22, 1988, Page 53) have been added.

Unfortunately, it can still seem slow. For simple drawings it is acceptable, but for complex final drawings on a Mac Plus or SE, it will drive you up the wall. Illustrator '88 seems to run at about the same speed. On a Mac II or IIx you can live happily with either product's speed.

If you are looking for a powerful Macintosh graphics drawing package, optimized for Postscript, with full command of color and pattern on the screen and in your printer or typesetter, you will be happy with either program. Until Adobe introduces a superior version of Illustrator, Freehand has the edge. We rate Freehand 2.0 a very good value. □

Michael Ward is a consultant with Expert Management Services, a management services company in San Jose, California. He has been using and evaluating graphics packages since 1983.

GOT TWO OPTIONS: Spend \$6,000 with Excel...or take saving \$6,000 with SuperCalc5.

\$6,000 for every workstation.

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Tomorrow comes in a blue and red box. *SuperCalc5* is the spreadsheet of the future, ready for you today. First of all, it works with the hardware you most likely have on your desk right now, including all IBM PC, XT, AT and PS/2 models and compatibles with 512K memory.

SuperCalc5 has been designed for MS-DOS and to bridge the migration to OS/2. It also supports LIM version 4.0 providing up to 32 mb of memory.

In use, *SuperCalc5* holds up to 255 spreadsheets in memory and allows you to view and manipulate any three of them on screen at any one time. Direct links can be established with spreadsheet files in memory, on disk or on a network. And these can be a combination of *SuperCalc* and Lotus 1-2-3.

Files. There's even a version for your company mainframe called *CA-SuperCalc*.[®]

SuperCalc5 was designed to coexist with Lotus 1-2-3. Not only does it read, write and link to 1-2-3 files automatically.

SuperCalc5 includes an optional 1-2-3 menu and can use 1-2-3 macros. You can even move Lotus 1-2-3 macros into *SuperCalc5* and then back again.

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Comprehensive debugging and auditing features are built right into *SuperCalc5*. When used along with the *tude* feature, they ensure that errors in your worksheets and macros will not cost more than you can afford.

SuperCalc5 works fast because it has minimal recalculation and the ability to choose recalculation ranges.

A good beginning and a beautiful finish.

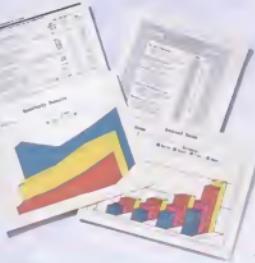
SuperCalc5 has automatic installation and its intuitive command structure means that you can be up and running in a matter of minutes.

Finally, *SuperCalc5* will make your work look sensational. Your presentation will spring to life

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Qualified prospects can take advantage of one of two *SuperCalc5* introductory programs. You can receive a copy of *SuperCalc5* to use on your present computer for 30 days with no obligation. Or trade in your present spreadsheet program and get *SuperCalc5* for \$100. Both offers expire June 30, 1989. For more information or the name of the participating dealer near you, call 1-800-531-5236. (1-800-663-6904 in Canada).



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storing it for their future reference.

If the mail was sent to the host via "special delivery," T-Post Central immediately calls the recipient's computer to deliver the mail; if that's not possible, the mail waits at the host until the recipient can collect it.

An automatic send/receive mode lets you send or receive mail continually during off-work hours or in the background when PC T-Post is running under Double DOS or Desqview. In the latter mode, the program waits to receive calls for five minutes and then checks the mailbox to see if there's anything to send; this cycle continues until the user presses the Exit key.

When sending mail, remote users are required to provide an access ID, while mail collection is regulated by inputting a separate password. Users who attach their password to their access ID when sending mail will automatically receive all mail currently addressed to them. The host program offers a selective callback security feature where, whenever a designated user calls for mail pickup, T-Post Central hangs up and calls the user back at a predetermined number to send mail.

Remote users can download files from a host library subdirectory that is intended for storing forms, newsletters, distribution lists, and other information shared by the E-Mail system users. Remote users can also customize a number of features, including printing mail as it is received and varying the time of the receive mode and the number of times PC T-Post will try to mail a letter before it puts it on hold.

The remote user can send mail directly to another T-Post user without going through T-Post Central, if desired. Mail can be sent immediately or set aside for mailing at a scheduled time. If the user receives a busy signal 10 times (the default setting), or if the receiver isn't in receive mode, a special feature puts the message on hold in the remote user's mailbox until the mail is collected. Forwarding your mail through T-Post Central ensures that it won't stack up at your local computer.

The T-Post system is designed to work with or without PC T-Post. This means that anyone you authorize can pick up or leave mail. Coker Electronics provides a record format for a header, as well as other files, so users can create their own address headers for non-T-Post mail.

The host system's mail distribution capability lets you create files with any number of names, phone numbers, and access IDs. When a remote user sends mail to the host referencing a host distribution list, T-Post Central automatically sends the mail to all users on the distribution list. If desired, remote users can make up their own distribution lists; however, the mail can't be forwarded via T-Post Central.

Two utilities perform the host system's housekeeping duties. Mail Manager deletes selected categories of mail and TP-Butler runs a user-written program or batch file that performs selected functions (e.g., backups, report generation) at scheduled intervals.

PERFORMANCE:

Our T-Post system performed basic E-Mail tasks quite well. The dedicated system running T-Post Central went into its automatic send/receive mode and correctly received and delivered mail as scheduled.

Mail sent from standard communications packages went through without trouble. Central's file management utility does a fine job of categorically deleting mail. For example, you can select to delete all mail that has been on hold for

30 days. PC T-Post could use a similar strategy — instead, you have to delete each file one at a time.

Before a send or receive activity, PC T-Post spends five to 15 seconds resetting the modem. During this time, the program rechecks the modem for an "OK" response to assure reliable unattended operation. This may be annoying, but we think it's worth the few extra seconds.

The command-line parameters are great for customizing a session. If you receive a lot of mail and don't send much, set the receive time to 60 minutes between sends. If you do a lot of mailing, set send to run every two or three minutes. Another parameter lets you

view all the commands and replies between the program and the modem.

The mail-viewing option works well for basic operations, but could be enhanced. The mail list summary shows the day a message is sent or received but not the time of day. However, time and additional information can be seen at the top of the file when opened. Also, there is no indicator showing whether mail is new or previously read, and you can't compose replies directly from the view screen or automatically associate them with a piece of mail. Mailing from the remote system went smoothly, except when the F1 key's function switched from Continue to Exit.

To see what would happen, we attempted to send mail using an Anchor Signalman modem, which is not Hayes compatible. The modem was unable to receive most of the T-Post mail we sent. The Hayes brand and the Hayes-compatible Avatex modems we used worked fine.

We had a problem sending a letter with an attachment and mailing it immediately via special delivery. T-Post sent the attachment, but not our cover letter, and then hung up. During the next automatic send cycle, the cover letter was sent. When we called Coker, they said the problem had been corrected and sent us an update diskette. We checked the disk and found that the problem was resolved.

Push your software to the limit.

If you want to get the most out of today's new, high-powered software applications, we have a few words of advice:

Use a Microsoft Mouse.



Microsoft Mouse & Microsoft Windows 286

It looks innocent enough here, but wait until you see how the Mouse makes your software scream.

The Mouse can unleash your software—and take full advantage of the features intended to make your work easier.

With the Mouse you can effortlessly manipulate menu-driven applications without taking your eyes off your screen. You can pull down menus. Highlight text in one fell swoop. Copy, cut and paste formulas in spreadsheets easily. And move things from here to there without any command-key mumbo jumbo.

Literally hundreds of applications support the Mouse. But as the leading software developer for personal computers (and one of the first to bring a graphical interface to PC screens), we've gone a step further. Microsoft Windows 286 with PC Paintbrush® for Windows, Microsoft Paintbrush or EasyCAD™ 2 actually come with the Mouse (or vice versa).

Already, the Microsoft Mouse has made its way into the hands of over one million personal computer users. And that number is sure to grow even faster. After all,

graphically oriented software is the driving force behind improved productivity.

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Bruce Sobolov, Director,
Equipment Planning and Administration,
Election & Survey Unit, CBS News

Laura Gismondi,
Account Executive,
AT&T Data Systems Group

Bruce Goldberg,
Area Technical Manager,
AT&T Data Systems Group



Bruce Sobolov of CBS News, Laura Gismondi and Bruce Goldberg, AT&T, savor the afterglow of their own post-election victory. They take us behind the scenes for a glimpse at some of the reasons why CBS was successful on election night.

FEBRUARY 15, 1989

AT&T: Afterwards, the critics said CBS was the best, the fastest.

CBS: Right, but we sweated it out for more than a year. With more 20-hour days than I care to remember.

AT&T: Your situation was pretty complicated.

CBS: We were faced with election projections, exit-poll analysis, and other studio programming applications running on IBM hosts.

AT&T: Plus the NewStar system we tied in with our wide-area network, ISDN. It's distributed networked computing. Hey, we thrive on this stuff.

CBS: We're impatient around here. Speed is the only way you succeed with election coverage. The first thing we did was provide multi-host access with the 6500 System. Last election, everybody who needed access to two systems used two terminals. Twice the space, twice the cable, additional controllers, added expense, and wasted time.

We had programmers working simultaneously on three host applications, two bisync, one SDLC. They were constantly skating between terminals, wearing ruts in the rug. Now they have access to multiple sessions simultaneously from one terminal.

AT&T: The data moves over twisted pair, the same type wiring the technicians pulled for your System 75 PBX. That made sense.

CBS: An added advantage was having the same dedicated AT&T technicians installing and maintaining our system, providing consistency to my operation.

AT&T: But really, Bruce, why us?

CBS: Your responsiveness. At

Skating between terminals put ruts in the rug.

CBS, we all agreed that what we needed was someone who could deliver it fast, install it, test it, and support it. And you were hungry. You never said, "No, we can't do it." And you never took long to say "yes."

AT&T: You had computer networking problems. Solving them is the house specialty.

CBS: We do distributed computing to the nth degree. Our reporters are all over the country. They call in their results when the precinct closes. Before, we had over a hundred operators standing by, with phones and terminals. That election night we introduced the voice response system running on AT&T PCs.

AT&T: How many calls?

CBS: Thirty, thirty-two calls at once, reporters everywhere having voice response conversations with the IBM host. And all done with the same

custom host software we always used. We greatly reduced our cost.

AT&T: The other networks are watching, thinking, "How come CBS has the results already and we don't?"

CBS: It was a good night for us. Now the name of the game is streamlining for 1990. We're talking about a networked computer solution as a gateway into different host systems.

AT&T: With the AT&T Systems already up, running, and in place, we can almost completely automate your survey system.

CBS: That's a real big plus for all of us.

AT&T: Something tells me I've seen that same glint in your eye before. (Laughter)

The CBS Solution:

THE CHALLENGE:

Integrate IBM and DEC host computers and NewStar editorial system. Build an advanced computerized voice response system to speed election-night projections.

THE SOLUTION:

AT&T 6500 Multifunction Communication System with multi-host sync/async 6529 terminals. AT&T CONVERSANT® Voice System for advanced communications running on AT&T WGS computers. AT&T System 75 PBX. AT&T Information Systems Network (ISN), a wide-area network.

THE RESULT:

CBS News provided fast, accurate election coverage throughout Campaign '88. The *Baltimore Sun* reported that, "CBS was recording results in all sorts of key races faster and with far more authority than either of the other networks."

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T-Post Central's utility menu lets you select mail options and utilities for sending and receiving mail, and it also displays current mailbox status.

The T-Post system's smooth operation and handy features earn it a good rating in performance.

DOCUMENTATION:

Each T-Post program has its own manual. Although the descriptions and explanations are quite complete, the organization is sometimes confusing.

The automatic sending and receiving of mail (one of the system's most important features) doesn't have a separate chapter. In addition, some of the more advanced features, which would be fine as part of an appendix, are included in the main body. We also found that the index leaves out some references and the table of contents in the T-Post Central manual doesn't reference page numbers. The main menu has an adequate help option, but the program offers no context-sensitive help.

Because the documentation clearly describes the product and how to use it, we rate documentation satisfactory.

EASE OF LEARNING:

The manual clearly explains how to install and start T-Post; installation is as easy as any program we've seen. Coker Electronics suggests you reformat or defragment your hard disk before loading the host program; disk access will be faster since the files will be contiguous situated on the hard disk.

Learning how to run T-Post will take users several hours. In addition, it will take some time to prepare extra details such as a password file. Although not difficult, this task is time-consuming. We rate ease of learning for T-Post as satisfactory.

EASE OF USE:

The thread of an E-Mail conversation is difficult to track and may be easily lost. You can't delete a letter immediately from the view screen. Instead, you have to pass through the view menu and reenter the number of the letter you want to delete. The T-Post editor holds 400 lines, which is more than sufficient. However, there isn't a word-wrap feature; we got tired of reading letters with words split in the middle.

Using a library subdirectory requires extra maintenance. The remote user can't see the file names in the host computer's subdirectory. The manual recommends you put a file called DIR in the Library to hold file names. To find a file, the remote user has to download DIR to read the list of subdirectory file names and then make a second request for a particular file.

Setting up Central's distribution lists, password files, and library files take

some work. The person in charge of the host system needs to keep good records and maintenance schedules to maintain the system. While each piece of mail on the host requires its own file, a file that is sent to multiple people via a distribution list is only stored once, saving considerable space.

It shouldn't take users more than a couple of days to become familiar enough with PC T-Post to ship mail around with flair. The command-line parameters allow users to tailor features. We would like to see a few refinements, however. For example, to collect your mail from another T-Post computer, you have to go through the process of sending your request via a letter. An automated mail pickup option would be much simpler. Like its performance, T-Post's ease of use has only a few minor rough edges and rates good.

ERROR HANDLING:

We didn't run into any major snags. Sending and receiving mail seemed foolproof. Invalid passwords or access IDs resulted in having to resend the mail. If T-Post users connect at mismatched bps rates, the host machine automatically adjusts to match the remote modem. We didn't experience any lockups or lost data. We rate the program's error handling as very good.

SUPPORT:

Coker offers a 30-day money-back guarantee for its product. Telephone support is free for 120 days and costs \$25 a year for each station after that. The charge for extended phone support is balanced by the money-back guarantee. Support policies are good.

We were impressed with the level and enthusiasm of Coker Electronics' customer support staff. One technician patiently and clearly explained a number of technical considerations, while another support person called our T-Post Central to deliver test mail.

Because the extra attention we received from the technicians went beyond the call of duty, we rate technical support excellent.

VALUE:

Coker Electronics' T-Post provides a complete private E-Mail system at a reasonable price; T-Post Central sells for \$129, T-Post Faxforward sells for \$129, and PC T-Post sells for \$129 (each additional copy is \$99). However, there are expenses besides the T-Post software: T-Post Central requires a dedicated machine for optimal performance, and there are a number of maintenance chores that

require staff time.

One alternative is commercial services such as MCI Mail; if your volume of E-Mail is large enough, T-Post will save you money in the long run. Another alternative is conventional bulletin board systems, also based on dedicated PCs and widely used as electronic message centers. T-Post is easier and quicker because you can download all your messages in a keystroke, rather than having to browse through a directory to select messages, as with most BBSEs. T-Post Central will also call a distribution list to automatically send mail to remote sites, which is another advantage over the basically passive BBSEs. This feature requires that you dedicate PCs to remote sites to answering the phone, either permanently or on specific periods such as overtime.

T-Post works well and offers interesting unique features as a remote E-Mail system; considering its solid performance and excellent support, we rate value good.

Glen Tapanila is a systems analyst for the state of Washington.

REPORT CARD INFO WORLD

ELECTRONIC MAIL

T-Post Remote E-Mail

CENTRAL 4.1/T-POST 3.0

Criteria	(Weighting)	Score
Performance	(400)	Good
Documentation	(75)	Satisfactory
Ease of use	(50)	Satisfactory
Ease of learning	(100)	Good
Error handling	(75)	Very Good
Support		
Support policies	(50)	Good
Technical support	(50)	Excellent
Value	(200)	Good
Final score		6.3

PRODUCT SUMMARY

Company: Coker Electronics, 1430 Lexington Ave., San Mateo, CA 94402; (415) 573-5515.

List Price: T-Post Central is \$229; PC T-Post is \$129 (two or more are \$99 each); T-Post Faxforward is \$129 end runs on the host machine.

Requires: IBM PC, XT, AT, PS/2, or compatible; DOS 2.0 or later; Hayes-compatible modem; T-Post Central requires 640K RAM, 20-megabyte hard disk recommended; PC T-Post requires 256K RAM (640K RAM required when running PC T-Post under Double DOS or Desview).

Support: Free telephone support for 120 days, not toll free; 30-day unconditional money-back guarantee.

Prec: Easy-to-use remote-access private mail system; error-free unattended operation; excellent technical support; good security features.

Cens: Some operations and the manual could be more sophisticated; there are quite a few maintenance operations to keep track of.

Summary: T-Post, an unusual system that lets remote users call in to send or receive E-Mail, works quite well and could be very useful to a distributed op-

InfoWorld Guide to Reviews

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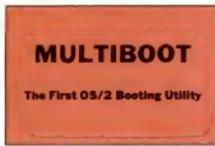
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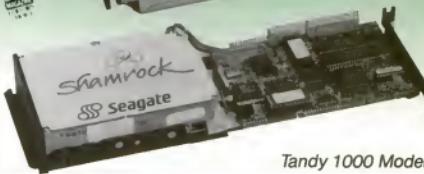
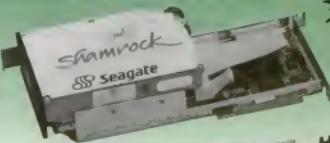
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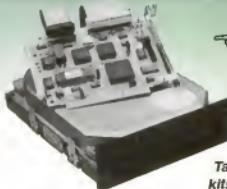
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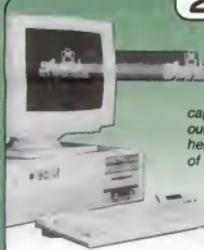
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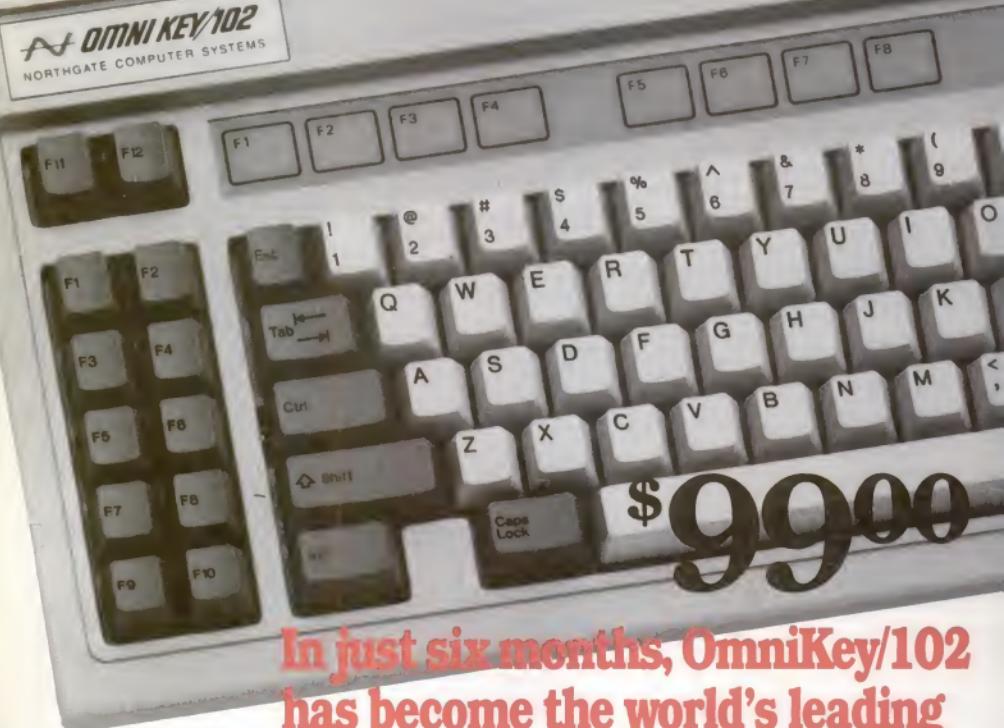
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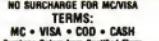
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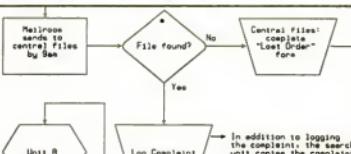
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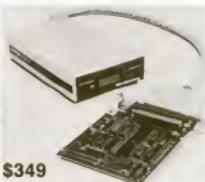


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Intel

Continued From Page 1

board could be used for the processing, with the PC's bus managing I/O and other tasks.

IMPRESSIVE GRAPHICS. An application in which the chip will provide tremendous improvements is as a graphics accelerator. The graphics functions of the chip, when combined with the high-speed floating-point unit, will provide exceptional graphics performance.

In part, the enhanced performance is due to the chip's 4K instruction and 8K data cache, which allows vector data to be read from external memory at the same time that vector results are stored in the data cache.

On-board memory management also makes the chip well-suited for use as the main microprocessor in Unix workstations, according to a computer designer who has reviewed the specifications. "It'll make one hell of a workstation," he said.

SUPERCOMPUTER USES. One additional approach would be in a supercomputer that uses many of the chips in a parallel architecture, performing at 200 or more MIPS. By placing four or five of the chips on a common bus and providing needed caching or common memory, chip performance can be roughly additive, one analyst said.

According to the paper presented by Intel last week, the new RISC chip can be roughly divided into three operational areas: One is devoted to integer instructions; one to floating-point instructions, including the 3-D graphics unit; and one to instruction and data caches.

The chip's floating-point processing unit can process one 64-

Even More Powerful Chips in Works

Attendees at last week's International Solid State Circuits Conference (ISSCC) got a glimpse of microprocessors that could portend much faster, more easily modified, and more powerful desktop computers and workstations.

A processor chip expected to beat the Intel N-10's 50-MHz processing speed (see accompanying story) by a healthy 40 percent was announced by the Hitachi Laboratory and Device Development Center. The 32-bit chip will operate at 70 MHz and is said to perform 32-bit fixed-point calculations at up to 70-million instructions per second (MIPS). The processor employs an architecture known as bipolar CMOS. Having the equivalent of 20,000 transistors, the chip is designed to run in a normal office without extra cooling, Hitachi said.

Texas Instruments announced two erasable/programmable read-only memory (EPROM) chips that could allow development of diskless workstations that can be easily upgraded without chip switching and may enable upgrading of computer BIOS logic without removing or replacing ROM chips.

A Flash EEPROM (electrically erasable PROM) announced by TI last week overcomes many of the limitations of standard EPROM devices, which must be exposed to ultraviolet light for 15 minutes or more to erase data. A Flash EEPROM can be rapidly erased using specially controlled electrical current. Then, other data can be recorded onto the chip. The data on the device remains unchanged, even if power is cut off. Once recorded, the data can be considered nonvolatile and can be used for loading and running software or other uses where permanent, fast, nonvolatile storage is needed.

A second type of EPROM, referred to by TI as a Burst Mode EPROM, is said to overcome speed limitations that have hindered performance of EPROMs in high-speed systems. A "burst mode" memory configuration allows significant memory access speed improvements over traditional EPROMs.

Performance of the new chip is said to decrease or eliminate the need for a program cache buffer that previously was necessary to match the speed of the processor to that of the EPROM. The new chip is said to be useful in programs requiring rapid program memory access such as those used with RISC processors.

Pricing and eventual ship dates for the chips were unavailable.

—Mark Brownstein

bit or two 32-bit operations at a time at speeds as high as 50 MHz, according to Intel's technical paper.

In addition to the RISC, floating-point processor, and 3-D graphics components, the chip includes a memory management unit. The on-board memory management unit de-

livers linear address space which eliminates the memory segmentation performance overhead found in pre-386 Intel microprocessors.

Intel officials wouldn't comment on pricing and availability of the chip until the formal announcement expected next week.

The first release of the program will run under Microsoft Windows but a future version is also planned for OS/2 Presentation Manager.

Ironically, industry insiders said, a product that makes it radically easier to build applications may also turn out to be extremely hard to sell.

"How do you sell something

that's everything to everybody?" asked one source, who suggested that one way to gain user acceptance would be to bundle the program with other programs, or with hardware as Apple did with Hypercard.

"It's going to be hard to sell," agreed another source. "I don't think they [Asymetrix] understand how to market it."

Asymetrix apparently recognizes its challenge, the company's business card bore the slogan "Software defined."

In fact, those people who have seen it tend to describe it in terms of what it isn't. "It's not like Layout," an applications design package from Matrix Software Technology, said another source who has seen it. (See "Matrix Releases CASE Tool for Developers," February 13, Page 20.)

Whether users will flock to the package remains to be seen, but the company has a major advantage over other startups. Allen, Microsoft's second biggest stockholder, is estimated to be worth more than \$500 million.

chairman of, "COS will be doing some 802.5 conformance testing," Metcalfe said. "But the COS charter doesn't allow it to take over the marketing and promotion functions of OTF."

A more positive interpretation came from Bill Swift, 3Com's Token Ring product manager and an OTF director. "We're already accomplishing our objective," Swift said. "Since OTF, IBM has started to talk with us about program interfaces. Previously, we didn't even know who at IBM to talk with. And the people we are talking with at IBM have made it clear that the door [to participation in OTF] is still open."

Phoenix

Continued From Page 1

marketplace. Analysts have pointed out in the past that this lack of binary compatibility has stymied the growth of Unix and encouraged fragmentation.

"The problem is there hasn't been anyone bold enough to arbitrate some of the technologies that would allow it [Unix] to take off," said an analyst briefed on the deal by both companies.

"This might be the final piece we need to entice MS-DOS and Mac applications developers to bring their products to the Unix market," said Paul Cubbage, Unix analyst at Dataquest. "The fragmentation of the Unix market has been a de-motivator to the PC applications vendor, but if we can tell them that just one port is needed, it will be a big motivator."

"The Phoenix software layer will have the largest effect on heterogeneous networks trying to achieve interoperability," Cubbage said. "The system administrator doesn't want to have to recompile every piece of software he owns, just because he's added a new network node."

"There will still be one more problem in the conversion of PC software to Unix, however," Cubbage said. "They'll still have to figure out how to implement software 'keys' that regulate the usage of the software in a multi-user environment."

Officials from both AT&T and Phoenix declined to comment on the deal.

It wasn't clear from sources when and if Sun would endorse the agreement, but they expected the company to do so shortly after AT&T and Phoenix made their announcement.

Sun's commitment to the deal is important because of the large number of compatible programs available for its machines. Analysts said there are about 2,000 such programs. Sun appears to see some advantage to creating a compatible market, as witnessed by its recent licensing agreement allowing Solbourne Computer Inc. to produce a compatible system.

To make the deal work, major vendors of Unix and DOS-compatible applications must port their products over. Companies like Lotus Development Corp. and Ashton-Tate have promised versions of their best-selling programs for DEC's graphical interface, DEC-Windows, but have been relatively quiet of late about versions for Unix.

This deal may help simplify the Unix market, it won't be a panacea, some observers note. They believe the OSF is a force to be seriously considered, as well as anything Microsoft and The Santa Cruz Operation Inc. combination might produce with Xenix. (See related story, Page 5.)

"You will still have three camps developing out there — AT&T/Sun, OSF, and Microsoft/SCO/But, in a way, it is better than the 40 different camps of the past," said David Bayer, an analyst with Montgomery Securities Inc., in San Francisco.

Generator

Continued From Page 1

interact with other Windows programs, according to the sources.

"It goes far beyond Hypercard," said one industry insider. "Apple is scared."

Open Token

Continued From Page 1

PC LAN 1.3 — are not compatible with IBM's own published Application Programming Interfaces and create just the sort of interoperability difficulties that OTF has pledged to resolve.

According to Metcalfe, IBM representatives speaking at the recent Communication Networks show in Washington suggested that OTF might be more acceptable to IBM if it were folded into an organization like the Corporation for Open Systems (COS), which Metcalfe is

chairman of. "COS will be doing some 802.5 conformance testing," Metcalfe said. "But the COS charter doesn't allow it to take over the marketing and promotion functions of OTF."

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NOTES FROM THE FIELD ■ BY ROBERT X. CRINGELY

Not Even Feds Can Stop St. Valentine's Massacre

In 1927, when my father was 7 years old and living in Chicago, a burst of gunfire in the next block announced the St. Valentine's Day Massacre, when half a dozen hooded gunmen downed half a dozen other hoods and my father learned the smell of cordite.

I was thinking about this last Tuesday when the phone rang and it was the FBI.

INDEX OF CRIME. I swore up and down that

I hadn't written any of those letters to Mrs. Bush, until the Feds calmed me down and asked about the virtues of Zynith vs. Ask Sam vs. Ize indexing software for their pending order of "intelligent workstations" (actually just 80386-based desktop PCs). I told them when we had reviewed these products, then offered to let them seize my files — figuring that's the only way I'll ever get them organized.

THE DOG ATE MY HOMEWORK. The G-Men became my alibi when I wandered home that night and found myself in trouble for having forgotten Valentine's Day. Pammy is no semi-detached house that was expecting something more than just the bottle of Old Bushmills I picked up at the liquor store on the way home.

I could have reasoned with her, pointing out that Lotus 1-2-3, Release 3 is not only late but may not even work on 80386/88 systems. I hear the same package will work under either DOS or OS/2 without modification; so users won't have to buy an upgrade if OS/2 ever sneaks into their operation. I could have done that, but I didn't.

And I could have argued that forgetting Valentine's Day is not as bad as Brown Bag Software shipping a box that says PC-Outline Plus on the outside but contains disks and documentation for the old PC-Outline 3.34 on the inside and an IOU for the real product, which is undergoing a QA catharsis. I could have said that, but I didn't.

MULTIFLUNKED. Instead, I lied, blaming my memory lapse on police brutality. And of course it didn't work. Here was Pammy, facing me down with hands on hips, wearing her favorite leather outfit and a look that said my excuse was going over like satanic verses. Dinner sat steaming in the background.

"I forgot, Pammy," I said. "There is so much to keep track of, and I just forgot. Windows 3.0 is in beta now, for example, and will be announced in March and shipped in the fall with the capability to run multiple simultaneous applications, like a Desqview. But weep not for Desqview because Quarterdeck has just taken on some venture capital from Ben Rosen's Sevin-Rosen" (apparently the first investment for Ben since Ansa).

EXCITED TO SOME. We sat down to dinner, surrounded by a stiff silence. "I just need to know you appreciate me, that's all!" Pammy said in her little-girl voice even before we could start to eat.

"Of course I appreciate you," I answered, reaching for the butter. "Who else but you and I know that NCR will introduce a line of monochrome X Window terminals called Tower View this month at Uniforum? One is a 15-inch with interlaced video, a Motorola 68000, and will sell for \$2,000 to \$2,500. The other is a 19-inch, 68020, non-interlaced unit for \$4,000 to \$4,500."

BUT WAIT, I KNOW BILL GATES! "That's not what I mean, and you know it!" Pammy shouted, rising from the table. "You care about this stuff, I don't. So what that AT&T will not be showing Open Look at Uniforum, possibly moving away from its alliance with Sun Microsystems? Who cares that Apple's C++ translator is horribly late because AT&T is a year behind with the new Version 2.0 that Zortec and Glockenspiel aren't supposed to know about? Apple is working on new ROMs programmed in C++ so Ma Bell really has them by the objects, but do I care? No!"

Taking a spent and sobbing Pammy in my arms, I noticed the smell of cordite in the room.

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Serviceability		
Workmanship	Very Good	Satisfactory
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Source: Infoworld December 12, 1988

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